

حمل الآن

مجاناً وحصرياً

امتحانات رقم (1)

الترم الاول



Model Examinations of the School Book on Algebra and Statistics



Model

1

Answer the following questions :

1 Choose the correct answer from those given :

- 1 The point $(-3, 4)$ lies in the quadrant.
(a) first (b) second (c) third (d) fourth
- 2 The positive square root of mean of the squares of deviations of values from its arithmetic mean is called
(a) the range. (b) the arithmetic mean.
(c) the standard deviation. (d) the mode.
- 3 If $3a = 4b$, then $a : b =$
(a) $3 : 4$ (b) $4 : 3$ (c) $3 : 7$ (d) $4 : 7$
- 4 If $n(X) = 2$, $n(Y^2) = 9$, then $n(X \times Y) =$
(a) 6 (b) 18 (c) 11 (d) 7
- 5 The range of the set of the values : 7, 3, 6, 9 and 5 is
(a) 3 (b) 4 (c) 6 (d) 12
- 6 If $y \propto X$ and $y = 2$ when $X = 8$, then $y = 3$ when $X =$
(a) 16 (b) 12 (c) 24 (d) 6

- 2 [a] If $X \times Y = \{(2, 2), (2, 5), (2, 7)\}$
 , find : 1 Y 2 $Y \times X$

[b] If a, b, c and d are proportional, prove that : $\frac{a}{b-a} = \frac{c}{d-c}$

- 3 [a] If $X = \{2, 3, 5\}$, $Y = \{4, 6, 8, 10\}$ and R is a relation from X to Y where " $a R b$ " means " $2a = b$ " for all $a \in X, b \in Y$
1 Write R and represent it by an arrow diagram.
2 Show that R is a function.

[b] Find the number that if we add it to each term of the ratio $7 : 11$, it becomes $2 : 3$

- 4 [a] If $X = \{1, 3, 5\}$ and R is a function on X , where $R = \{(a, 3), (b, 1), (1, 5)\}$, find :

1 The range of the function.

2 The value of $a + b$

- [b] If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 2$

, find :

1 The relation between x and y

2 The value of y when $x = 1.5$

- 5 [a] Represent graphically the function $f : f(x) = (x - 3)^2$, $x \in [0, 6]$, from the graph deduce the vertex of the curve, the minimum value of the function and the equation of the axis of symmetry.

- [b] Calculate the arithmetic mean and the standard deviation of the set of values :
8, 9, 7, 6 and 5

Model 2

Answer the following questions :

- 1 Choose the correct answer from those given :

- 1 The point $(3, 4)$ lies in the quadrant.

(a) first (b) second (c) third (d) fourth

- 2 is one of the measures of the dispersion.

(a) The median (b) The arithmetic mean
(c) The standard deviation (d) The mode

- 3 The third proportional of the two numbers 3 and 6 is

(a) $\frac{1}{2}$ (b) 9 (c) 2 (d) 12

- 4 If $n(X) = 2$, $n(Y \times X) = 6$, then $n(Y^2) = \dots\dots\dots$

(a) 4 (b) 9 (c) 16 (d) 12

- 5 The range of the set of the values : 7, 3, 6, 9 and 5 is

(a) 3 (b) 4 (c) 6 (d) 12

6 If $Xy = 7$, then $y \propto \dots\dots\dots$

(a) $\frac{1}{X}$

(b) $X - 7$

(c) X

(d) $X + 7$

2 [a] If $X = \{2, 5\}$, $Y = \{1, 2\}$, $Z = \{3\}$

, find : 1 $n(X \times Z)$

2 $(Y \cap X) \times Z$

[b] If b is the middle proportional between a and c , prove that : $\frac{a-b}{a-c} = \frac{b}{b+c}$

3 [a] If $X = \{1, 3, 4, 5\}$, $Y = \{1, 2, 3, 4, 5, 6\}$ and R is a relation from X to Y

where " $a R b$ " means " $a + b = 7$ " for all $a \in X, b \in Y$

1 Write R and represent it by an arrow diagram.

2 Show that R is a function.

[b] If $5a = 3b$, find the value of : $\frac{7a+9b}{4a+2b}$

4 [a] If $f(X) = 4X + b$ and $f(3) = 15$, find the value of : b

[b] If $y \propto X$, $y = 6$ when $X = 3$, find :

1 The relation between X and y

2 The value of y when $X = 5$

5 [a] Represent graphically the function $f : f(X) = 4 - X^2$, $X \in [-3, 3]$, from the graph deduce the vertex of the curve, the maximum value of the function and the equation of the axis of symmetry.

[b] The following frequency distribution shows the number of children of some families in a new city :

Number of children	0	1	2	3	4	Total
Number of families	6	15	40	25	14	100

Calculate the mean and the standard deviation of the number of children.

2026

Governorates' Examinations on Algebra and Statistics



1

Cairo Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from those given :

- 1 $x^2 - y^2 = (x + y) (\dots\dots\dots)$
 - (a) $x - y$
 - (b) $x + y$
 - (c) xy
 - (d) $y - x$
- 2 If the quantities a , b and c are in continued proportion , then $b^2 = \dots\dots\dots$
 - (a) $a + c$
 - (b) $a c$
 - (c) $a - c$
 - (d) $a \div c$
- 3 The range of a set of values = the greatest value $\dots\dots\dots$ the smallest value.
 - (a) $\div$
 - (b) $\times$
 - (c) $-$
 - (d) $+$
- 4 The solution set of the equation : $x^2 = -9$ where $x \in \mathbb{R}$ is $\dots\dots\dots$
 - (a) $\{3\}$
 - (b) $\{-3, 3\}$
 - (c) $\{-3\}$
 - (d) $\emptyset$
- 5 If $(4, 6) \in \{4, 8\} \times \{3, k\}$, then $k = \dots\dots\dots$
 - (a) 8
 - (b) 6
 - (c) 4
 - (d) 3
- 6 The function $f : f(x) = 9$ is represented graphically by a straight line passing through the point $(7, \dots\dots\dots)$
 - (a) -7
 - (b) zero
 - (c) 7
 - (d) 9
- 7 If 3 is added to the two terms of the ratio $5 : 9$, then it becomes $\dots\dots\dots$
 - (a) $3 : 2$
 - (b) $2 : 3$
 - (c) $7 : 11$
 - (d) $3 : 5$
- 8 If $(3, y + 1) = (x, 5)$, then $xy = \dots\dots\dots$
 - (a) -15
 - (b) -2
 - (c) 12
 - (d) 15
- 9 If $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(x) = 4 - x$, then $f(-4) = \dots\dots\dots$
 - (a) -8
 - (b) zero
 - (c) 4
 - (d) 8

Second Group :

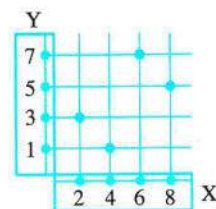
► Answer the following questions showing the steps of solution :

- 10 If $y \propto x$ and $y = 3$ when $x = 6$, find :

- (1) The relation between y and x
- (2) The value of y when $x = 10$

11 If a, b, c and d are proportional quantities, prove that : $\frac{a+b}{c+d} = \frac{b}{d}$

12 The opposite cartesian diagram represents the relation R from X to Y



(1) Write R as a set of ordered pairs.

(2) Is R a function or not ?

If it is a function, write its range.

13 If $X+1, X+2, 3, 4$ are proportional quantities, find the value of X

14 If $\frac{X}{5} = \frac{y}{6}$, find the value of the expression : $\frac{2X+y}{y-X}$

15 Graph the curve of the function $f : f(X) = X^2 - 1$, where $X \in [-2, 2]$

From the graph find :

(1) The coordinates of the vertex of the curve.

(2) The minimum value of the function.

16 Calculate the mean and the standard deviation for the values : 4, 6, 8, 10, 12



Giza Governorate



Answer the following questions :

First Group :

► Choose the correct answer :

1 If 16, X , 2 and y are proportional quantities, then $\frac{X}{y} = \dots\dots\dots$

- (a) $\frac{1}{8}$ (b) 32 (c) $\frac{1}{32}$ (d) 8

2 If $X = \{2, 4\}$ and $n(X \times Y) = 6$, then $n(Y)^2 = \dots\dots\dots$

- (a) 3 (b) 4 (c) 9 (d) 16

3 If $2^{X+3} = 1$, then $X = \dots\dots\dots$

- (a) 3 (b) -3 (c) zero (d) -2

4 If 6 is the middle proportional between the two numbers 9 and k , then $k = \dots\dots\dots$

- (a) ± 1 (b) 4 (c) ± 4 (d) 3

5 The solution set of the equation : $X^2 - 25 = 0$ in $\mathbb{N}$ is $\dots\dots\dots$ (where $\mathbb{N}$ is the set of the natural numbers)

- (a) $\{5, -5\}$ (b) $\{-5\}$ (c) $\{5\}$ (d) $\emptyset$

- 6 If the point $(a - b, 5)$ lies on the y-axis, then
- (a) $a = b$ (b) $a + b = 5$ (c) $a = -b$ (d) $a = 5 + b$
- 7 If $\frac{y}{x} = \frac{5}{2}$, then $y \propto$
- (a) x (b) $\frac{1}{x}$ (c) x^2 (d) $x - 3$
- 8 One of the measures of the dispersions is the
- (a) arithmetic mean. (b) median.
(c) mode. (d) standard deviation.
- 9 If $f(x) = 5$, then $3f(-5) =$
- (a) -2 (b) 15 (c) -15 (d) -25

Second Group :

► Answer the following questions :

- 10 Calculate the standard deviation of the set of the following values :

12, 13, 16, 18 and 21

- 11 If $\frac{a+3b}{2a-b} = \frac{4}{3}$, then find : $\frac{b}{a}$

- 12 If $\frac{x}{4} = \frac{y}{5} = \frac{z}{3}$, then prove that : $\frac{x-y+2z}{2x+y-z} = \frac{1}{2}$

- 13 Represent graphically the curve of the quadratic function $f : f(x) = 4 - x^2$ where $x \in [-3, 3]$, and from the graph deduce :

- (1) The maximum or minimum value of the function.
(2) The equation of the axis of symmetry.

- 14 If $y \propto \frac{1}{x}$ and $y = 9$ when $x = \frac{2}{3}$, find :

- (1) The relation between y and x
(2) The value of y when $x = 2$

- 15 If a , b and c are in continued proportion, then prove that : $\frac{a+b}{b+c} = \frac{a}{b}$

- 16 If $X = \{-2, -1, 0, 1, 2\}$ and R is a relation on X where " aRb " means " $a + b = \text{zero}$ " for each $a \in X$ and $b \in X$, then :

- (1) Write R and represent it by an arrow diagram.
(2) Show if R is a function or not.



Answer the following questions : (Calculator is allowed)

First Group :

► **Choose the correct answer from those given :**

- 1 If $(X^3, y + 1) = (27, \sqrt[3]{27})$, then $X + y = \dots\dots\dots$
(a) 5 (b) 4 (c) 3 (d) 2
- 2 Quarter the number 4^{12} equals $\dots\dots\dots$
(a) 4^3 (b) 4^{11} (c) 4^{13} (d) 1
- 3 The difference between the greatest value and the smallest value of a set of values is called the $\dots\dots\dots$
(a) range. (b) arithmetic mean.
(c) median. (d) standard deviation.
- 4 If $X^2 - y^2 = 15$, $X + y = 5$, then $X - y = \dots\dots\dots$
(a) 3 (b) 5 (c) 15 (d) 75
- 5 If $Xy = 3$, then $y \propto \dots\dots\dots$
(a) $\frac{1}{X}$ (b) X (c) $X + 3$ (d) $\frac{X}{3}$
- 6 If $X = \{5\}$, then $n(X^2) = \dots\dots\dots$
(a) 1 (b) 2 (c) 10 (d) 25
- 7 If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a^2}{\dots\dots\dots} = \frac{c}{d}$
(a) b^2 (b) $a b$ (c) c (d) d
- 8 If $f(X) = 5$, then the value of $\frac{f(5) + f(-5)}{f(2) + f(-2)} = \dots\dots\dots$
(a) 1 (b) 5 (c) 10 (d) undefined.
- 9 If $R = \{(2, 5), (3, 6)\}$ is a function, then the range = $\dots\dots\dots$
(a) $\{2, 5\}$ (b) $\{3, 6\}$ (c) $\{5, 6\}$ (d) $\{2, 3\}$

Second Group :

► **Answer the following questions :**

- 10 If $X = \{0, 2, 4\}$, $Y = \{0, 4, 9, 16\}$ and R is a relation from X to Y where " aRb " means " $a = \sqrt{b}$ " for all $a \in X, b \in Y$, write R and represent it by an arrow diagram. Is R a function? and if the relation is a function, then find its range.

11 If $y \propto X$ and $y = 6$ at $X = 3$, then find :

(1) The relation between X and y

(2) The value of y when $X = 5$

12 Find the number which if added to the two terms of the ratio $5 : 7$, it will be $3 : 4$

13 If a , b and c are in continued proportion , prove that : $\frac{b}{c+b} = \frac{a}{b+a}$

14 If $\frac{X}{y} = \frac{2}{3}$, find the value of the ratio : $\frac{3X+2y}{6y-X}$

15 Represent graphically the function $f : f(X) = (X-2)^2$, $X \in [0, 4]$, and from the graph find :

(1) The equation of the axis of symmetry.

(2) The minimum value of the function.

16 Calculate the arithmetic mean and the standard deviation of the set of values :

12 , 13 , 16 , 18 , 21



El-Kalyoubia Governorate



Answer the following questions :

First Group :

► Choose the correct answer from those given :

1 If $3X = 5$, then $6X + 1 = \dots\dots\dots$

(a) 11

(b) 12

(c) 15

(d) 16

2 If $3^{X+2} = 27$, then $X = \dots\dots\dots$

(a) 0

(b) 1

(c) 2

(d) 3

3 If $(X+1, y-2) = (3, 4)$, then $\frac{y}{X} = \dots\dots\dots$

(a) $\frac{3}{4}$

(b) $\frac{4}{3}$

(c) $\frac{1}{3}$

(d) 3

4 If $X = \{2\}$, $n(Y) = 2$, then $n(X \times Y) = \dots\dots\dots$

(a) 1

(b) 2

(c) 4

(d) 8

5 If the point $(k, k^2 - 9)$ lies on the X -axis , then k can be equal to $\dots\dots\dots$

(a) 1

(b) 2

(c) 3

(d) 4

6 If $(2, 7) \in$ the function $f : f(X) = aX - 5$, then the value of $a = \dots\dots\dots$

(a) 3

(b) 4

(c) 5

(d) 6

7 The first proportional of the two numbers 4 , 8 is $\dots\dots\dots$

(a) 2

(b) 4

(c) 8

(d) 16

- 8 If y varies directly as X , and $y = 10$ when $X = 2$, then the value of y when $X = 4$ is
- (a) 10 (b) 20 (c) 40 (d) 50
- 9 The simplest method to measure the depression is the
- (a) range. (b) median.
(c) mode. (d) standard deviation.

Second Group :

► Answer the following questions :

- 10 If $X = \{1, 2, 3\}$ and R is a relation on X where " aRb " means " $a + b = 4$ " for each $a \in X$, $b \in X$, write R and represent it by an arrow diagram and show if R is a function or not.
- 11 If b is the middle proportional between a and c , prove that : $\frac{a+b}{b+c} = \frac{a}{b}$
- 12 If a, b, c and d are proportional quantities, prove that : $\frac{3a+2c}{3b+2d} = \frac{5a-c}{5b-d}$
- 13 Using the opposite table, answer the following questions :
- | | | | | |
|-----|---|---|---|----|
| y | 4 | 6 | 8 | 10 |
| X | 2 | 3 | 4 | 5 |
- (1) Determine the type of variation.
(2) Write the relation between y and X
(3) Find the value of X when $y = 7$
- 14 If $\frac{X}{3} = \frac{y}{2} = \frac{z}{5} = \frac{3X-2y+5z}{5k}$, find the value of k
- 15 Calculate the standard deviation of the values : 2, 7, 3, 6, 8, 4
- 16 Represent graphically the function $f : f(X) = X^2 - 4$, taking $X \in [-3, 3]$ and from the graph find :
- (1) The vertex of the curve. (2) The minimum value of the function.



El-Sharkia Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer :

- 1 If $a, 3, b, 2$ are proportional quantities, then $\frac{b}{a} = \dots\dots\dots$
- (a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $\frac{6}{5}$ (d) $\frac{5}{6}$
- 2 If $f : f(X) = (a+2)X^2 + 5X + m$ represents a straight line passing through the origin point, then $a + m = \dots\dots\dots$
- (a) -1 (b) -2 (c) 0 (d) 1

- 3 If the point $(3 - X, X - 4)$, $X \in \mathbb{Z}$ lies in the second quadrant, then $X = \dots\dots\dots$
 (a) 2 (b) 3 (c) 4 (d) 5
- 4 If the range of the values 18, 15, $k - 1$, 22, 17 is 9, then $k = \dots\dots\dots$
 (a) 8 (b) 17 (c) 25 (d) 24
- 5 If $n(X \cup Y) = 5$, then $n(X)$ can not be equal to $\dots\dots\dots$
 (a) 3 (b) 4 (c) 5 (d) 6
- 6 If $2b$ is the middle proportional between a and $5c$, then $\frac{b^2}{ac} = \dots\dots\dots$
 (a) $\frac{5}{4}$ (b) $\frac{2}{5}$ (c) $\frac{3}{5}$ (d) 10
- 7 If $(X^2 - 4)^{\text{zero}} = 1$, then $X \in \dots\dots\dots$
 (a) $\{4\}$ (b) $\mathbb{R} - \{4\}$ (c) $\mathbb{R} - \{-2, 2\}$ (d) $\{-2, 2\}$
- 8 If $\frac{5l + m}{2l + 3m} = 1$, then $l \propto \dots\dots\dots$
 (a) m^2 (b) $\frac{1}{m^2}$ (c) $\frac{1}{m}$ (d) m
- 9 If $\{3\} \times \{X, y\} = \{(3, 1), (3, 4)\}$, then $X - y = \dots\dots\dots$
 (a) 3 (b) -3 (c) ± 3 (d) 4

Second Group :

► Answer the following questions showing steps :

- 10 If y varies inversely as X and $y = 4$ when $X = 3$, find :

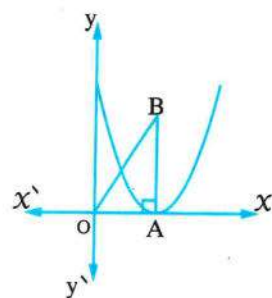
- (1) The relation between y and X
- (2) The value of X when $y = 6$

- 11 The opposite figure represents the quadratic function

$$f : f(X) = X^2 - 8X + k$$

If the area of $\triangle ABO = 8\sqrt{3}$ square unit, find :

- (1) The vertex of the curve.
- (2) The rule of the function which represents $\overrightarrow{OB}$



- 12 If a, b, c and d are proportional, prove that : $\frac{3a - 2c}{3b - 2d} = \frac{5a + 3c}{5b + 3d}$

- 13 If $X = \{1, 2, 3\}$, $Y = \{3, 4, 7\}$, R is a relation from X to Y where " aRb " means " $(a + b)$ is a prime number" for all $a \in X, b \in Y$, write R , represent it by an arrow diagram, then show if R is a function or not. Find the range if possible.

14 Find the number which if its three times is subtracted from each of the two terms of the ratio $\frac{49}{69}$, it will be $\frac{2}{3}$

15 If $\frac{a}{3} = \frac{b}{4} = \frac{c}{5}$, find the value of : $\frac{2b-c}{3a-2b+c}$

16 Calculate the arithmetic mean and the standard deviation for the values :
8 , 9 , 10 , 11 , 12



El-Monofia Governorate



Answer the following questions : (*Calculator is allowed*)

First Question :

[a] Choose the correct answer :

1 If $\frac{x}{2} = \frac{8}{x}$, then $x = \dots\dots\dots$

(a) - 4

(b) ± 4

(c) 4

(d) 16

2 $[3, 7] - \{3, 7\} = \dots\dots\dots$

(a) $[3, 7]$

(b) $]3, 7]$

(c) $[3, 7[$

(d) $]3, 7[$

3 If $X = \{1, 2\}$, $Y = \{5, 6\}$, then $(5, 1) \in \dots\dots\dots$

(a) $Y \times X$

(b) X^2

(c) $X \times Y$

(d) Y

[b] If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 2$, find :

(1) The relation between y and x

(2) The value of y when $x = 4$

Second Question :

[a] Choose the correct answer :

1 If $f(x) = 4$, then $f(4) = \dots\dots\dots$

(a) zero

(b) 8

(c) 4

(d) 16

2 If $X = \{3, 5, 7\}$, then $n(X^2) = \dots\dots\dots$

(a) 3

(b) 6

(c) 9

(d) 15

3 If $a, 2x, b, x$ are proportional quantities, then $a : b = \dots\dots\dots$

(a) $2 : 1$

(b) $1 : 2$

(c) $1 : 3$

(d) $2 : 3$

[b] If b is the middle proportional between a and c , prove that : $\frac{a^2}{b^2} + \frac{b^2}{c^2} = \frac{2a}{c}$

Third Question :

[a] Choose the correct answer :

1 The range of the values : 7 , 2 , 8 , 3 equals

- (a) 20 (b) 6 (c) 5 (d) 3

2 If $(x + 4, \sqrt[3]{27}) = (3, y)$, then the point (x, y) lies in the quadrant.

- (a) first (b) second (c) third (d) fourth

3 If $\frac{a}{3} = \frac{b}{4}$, then $4a - 3b + 7 = \dots\dots\dots$

- (a) 3 (b) 4 (c) 7 (d) 8

[b] If $X = \{1, 2, 3\}$, $Y = \{3, 4, 5, 6\}$ and R is a relation from X to Y where "aRb" means "a + b = 6" for every $a \in X, b \in Y$

(1) Write R and represent it by an arrow diagram.

(2) Is R a function or not ? Why ?

Fourth Question :

[a] Represent graphically the curve of the function f where $f(x) = 4 - x^2$, take $x \in [-3, 3]$ from the graph find :

(1) The equation of the axis of symmetry of the curve.

(2) The maximum value of the function.

[b] If $\frac{x}{y} = \frac{2}{3}$, find the value of : $\frac{3x - y}{2x + y}$

Fifth Question :

[a] Find the number which if added to the two terms of the ratio 7 : 11 , it will be 4 : 5

[b] Find the arithmetic mean and standard deviation of the values : 4 , 6 , 3 , 5 , 7



El-Gharbia Governorate



Answer the following questions : (Calculators are permitted)

First Group :

► Choose the correct answer from the given ones :

1 $2x^2 \times 3x = \dots\dots\dots$

- (a) $6x$ (b) $6x^2$ (c) $6x^3$ (d) $6x^4$

- 2 If $a < 2$, then the point $(|a| + 1, a - 2)$ lies in the quadrant.
 (a) first (b) second (c) third (d) fourth
- 3 If $n(X) = 2$, $n(X \times Y) = 2$, then $n(Y) =$
 (a) zero (b) 1 (c) 2 (d) 4
- 4 If $X = \{2\}$, then $X^2 =$
 (a) $\{(2, 2)\}$ (b) $\{4\}$ (c) $\{2\}$ (d) $(2, 2)$
- 5 If $f(X) = X + a$, and $f(2) = 5$, then $a =$
 (a) 1 (b) 2 (c) 3 (d) 5
- 6 The straight line which represents the function $f : f(X) = X + 2$ intersects the y-axis at the point
 (a) $(2, 0)$ (b) $(-2, 0)$ (c) $(0, -2)$ (d) $(0, 2)$
- 7 If $3a = 5b$, then $\frac{b}{a} =$
 (a) $\frac{5}{3}$ (b) $\frac{3}{5}$ (c) $-\frac{3}{5}$ (d) $-\frac{5}{3}$
- 8 The relation which represents a direct variation between the two variables X and y is
 (a) $\frac{X}{3} = \frac{2}{y}$ (b) $y = \frac{4}{X}$ (c) $y = X$ (d) $X = \frac{2}{y}$
- 9 If the standard deviation of the values : $X + 6$, $y + 7$, $X + y$ equals zero, then $X - y =$
 (a) 1 (b) -1 (c) 6 (d) 7

Second Group :

► Answer the following questions :

- 10 If $X = \{2, -1\}$, $Y = \{4\}$, find :
 (1) $X \times Y$ (2) $n(Y^2)$ (3) X^2
- 11 If $\frac{X}{y} = \frac{2}{3}$, then find the value of the ratio : $\frac{3X + 2y}{6y - X}$
- 12 Calculate the standard deviation of the values : 3, 6, 7, 9, 10
- 13 If y varies inversely as X and $y = 3$ as $X = 2$, find :
 (1) The relation between y and X (2) The value of y when $X = 1.5$
- 14 If b is the middle proportional between a and c , prove that : $\frac{a-b}{a-c} = \frac{b}{b+c}$
- 15 Find the positive number which if its square is added to the antecedent of the ratio 3 : 8 and its square is subtracted from its consequent, then the ratio becomes 7 : 4

- 16 Graph the function $f : f(x) = -x^2$, taking $x \in [-2, 2]$, then from the graph, find the equation of the line of symmetry and the maximum value of the function.

8

El-Dakahlia Governorate



Answer the following questions : (Calculator is permitted)

First Question :

- [a] If the value of speed (V) that water passes through a hose nuzzle inversely changes with the square of the hose nuzzle radius length (r), and $V = 5$ cm./sec. where $r = 3$ cm.

Find : V when $r = 2.5$ cm.

- [b] If $\frac{x+2y}{a+4b} = \frac{2y+5z}{4b+7c} = \frac{5z+x}{7c+a}$, prove that : $\frac{x}{y} = \frac{a}{2b}$

Second Question :

[a] Choose the correct answer :

- 1 If the point (x, y) lies on the third quadrant, then the point (x^3, y^2) lies on the quadrant.

(a) first (b) second (c) third (d) fourth

- 2 If a, b, c are proportional quantities, then $\frac{a}{c} = \dots\dots\dots$

(a) $\frac{b^2}{a^2}$ (b) $\frac{c^2}{b^2}$ (c) $\frac{b^2}{c^2}$ (d) $b^2 c^2$

- 3 If $f : f(x) = 3x + 5$, and $a + b = 9$, then $f(a) + f(b) = \dots\dots\dots$

(a) 37 (b) 32 (c) 27 (d) 14

- [b] If $x = z + 9$, $z \propto y$, and $x = 24$ when $y = 5$

(1) Find the relation between x and y (2) Find the value of y when $z = 12$

Third Question :

- [a] If a, 6, b, 54 are four positive quantities in continued proportion, find the values of a, b

[b] In the opposite figure :

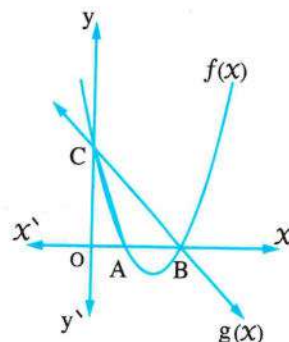
The straight line $x = 2$ is the axis of symmetry of the curve of the function $f(x)$, $\overline{BC}$ is graphically representation of the linear function $g(x) = mx + k$

If the area of $\triangle ABC = 3$ square units

, $AB = 2$ length units

(1) Find the values of : m, k

(2) Find : $g(4)$



Fourth Question :

[a] Choose the correct answer :

- 1 If $X : y = 3 : 2$, then $(6X - 9y - 1)^{2025} = \dots\dots\dots$
(a) - 2025 (b) - 1 (c) 1 (d) 2025
- 2 If the function $f : f(X) = (X)^{\frac{3}{k}} + (X)^{2-k}$ is a polynomial function , then the function f is of the degree
(a) zero (b) first (c) second (d) third
- 3 If $f : f(X) = X^2$ and $X \in [-2, 3]$, then $f(X) \in \dots\dots\dots$
(a) $[4, 9]$ (b) $[0, 4]$ (c) $[0, 9]$ (d) $[-9, -4]$

[b] Calculate the standard deviation for the next data : 4 , 8 , 12 , 10 , 6

Fifth Question :

[a] Choose the correct answer :

- 1 The range of the values : 7 , 3 , 6 , 9 , and 5 is
(a) 12 (b) 6 (c) 4 (d) 3
- 2 The ratio between the area of a square shaped region of side length (ℓ) cm. : The area of a square shaped region of side length (3ℓ) cm. is
(a) 1 : 3 (b) 3 : 1 (c) 1 : 9 (d) 9 : 1
- 3 If X and Y are two sets where $n(X^2) + n(X \times Y) = 5$, then $n(Y^2) = \dots\dots\dots$
(a) 25 (b) 16 (c) 4 (d) 1

[b] If $\mathbb{N}$ is the set of natural numbers , and R is a relation on $\mathbb{N}$ where " aRb " means " $a \times b = 8$ " for $a \in \mathbb{N}$, $b \in \mathbb{N}$

(1) Write R

(2) If $m R 4$, find the value of m



Ismailia Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from the given ones :

- 1 If $\sqrt{X} = 4$, then $X = \dots\dots\dots$
(a) 2 (b) 4 (c) 8 (d) 16

- 2 If $n(X^2) = 9$ and $n(Y^2) = 16$, then $n(X \times Y) = \dots\dots\dots$
 (a) 7 (b) 12 (c) 36 (d) 144
- 3 If $y \propto X$ and $y = 5$ when $X = 3$, then the constant proportional = $\dots\dots\dots$
 (a) 15 (b) 5 (c) $\frac{5}{3}$ (d) $\frac{3}{5}$
- 4 If $b < 3$, then the point $(5, b - 3)$ lies in the $\dots\dots\dots$ quadrant.
 (a) first (b) second (c) third (d) fourth
- 5 If the point $(2, k) \in$ the function $f : f(X) = X + 3$, then $k = \dots\dots\dots$
 (a) 5 (b) 6 (c) 7 (d) 9
- 6 $2^{25} = 2^{24} + \dots\dots\dots$
 (a) 1 (b) 2 (c) 2^{24} (d) 24
- 7 If $f(X) = 4$, then $f(2) \dots\dots\dots f(3)$
 (a) $<$ (b) $=$ (c) $>$ (d) $\neq$
- 8 If $y = 9X$, then $y \propto \dots\dots\dots$
 (a) X (b) $\frac{1}{X}$ (c) $2X + 7$ (d) $\frac{1}{X^2}$
- 9 One of the dispersion measurements is the $\dots\dots\dots$
 (a) mean. (b) median. (c) mode. (d) range.

Second Group :

► Answer the following questions :

- 10 If $X = \{0, 1, 2, 3\}$ and $Y = \{2, 3, 4, 5, 6\}$ and R is a relation from X to Y where " aRb " means " $a + b = 5$ " for all $a \in X$ and $b \in Y$
 (1) Find the relation R and represent it by an arrow diagram.
 (2) Is R a function or not? Why?
- 11 If X varies inversely as y and $X = 12$ when $y = 8$, find :
 (1) The value of X when $y = 1.5$
 (2) The value of y when $X = 2$
- 12 Graph the curve of the function $f : f(X) = X^2 - 2X$, $X \in [-2, 4]$, then from the graph deduce :
 (1) The coordinates of the vertex point of the curve.
 (2) The maximum or minimum value of the function.
 (3) The equation of the axis of symmetry of the curve.

13 If $\frac{x-2y}{x+3y} = \frac{1}{2}$, find the value of: $\frac{y}{x}$

14 If $\frac{x}{2} = \frac{y}{5} = \frac{z}{7}$, prove that: $\frac{5y-3z}{2z-3x} = \frac{1}{2}$

15 If b is the middle proportional between a and c, prove that: $\frac{a^2}{b^2} + \frac{b^2}{c^2} = \frac{2a}{c}$

16 Calculate the standard deviation of the values: 3, 6, 7, 9 and 15

10

Port Said Governorate



Answer the following questions :

First Group :

► Choose the correct answer from those given :

1 If $3^{x-5} = 1$, then $x = \dots\dots\dots$

- (a) 5 (b) zero (c) -5 (d) 1

2 If $xy = 5$, then $y \propto \dots\dots\dots$

- (a) x (b) $5x$ (c) $\frac{1}{x}$ (d) $x-5$

3 The point (2, -4) lies in the quadrant.

- (a) first (b) second (c) third (d) fourth

4 If $n(X) = 2$, $n(X \times Y) = 6$, then $n(Y) = \dots\dots\dots$

- (a) 8 (b) 4 (c) 3 (d) 1

5 The range of the values: 9, 5, 3, 2 is

- (a) 7 (b) 3 (c) 5 (d) 4

6 If $\sqrt{x} = 3$, then $x = \dots\dots\dots$

- (a) 3 (b) 6 (c) 9 (d) $\sqrt{3}$

7 If a, 6, 9 are in proportion, then $a = \dots\dots\dots$

- (a) 2 (b) 3 (c) 4 (d) 5

8 The function $f: f(x) = x(x+1)$ is from the degree.

- (a) zero (b) first (c) second (d) third

9 If $X = \{2\}$, then $X^2 = \dots\dots\dots$

- (a) $\{4\}$ (b) $\{2, 2\}$ (c) (2, 2) (d) $\{(2, 2)\}$

Second Group :

► Answer the following questions :

10 If $y \propto \frac{1}{x}$ and $y = 8$ when $x = 3$, find the value of y when $x = 4$

11 If $\frac{x}{3} = \frac{y}{4}$, find the value of : $\frac{x+y}{2x-y}$

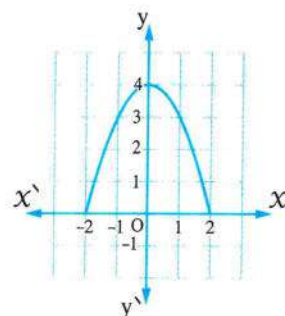
12 If a, b, c, d are proportional quantities, prove that : $\frac{a+b}{c+d} = \frac{b}{d}$

13 If $X = \{1, 2, 3, 4\}$, R is a relation on X where " aRb " means " $a + b = 5$ " for every $a \in X, b \in X$, write R and represent it by an arrow diagram. Is R a function? Why?

14 Find the arithmetic mean and the standard deviation for the values : 2, 5, 8, 11, 14

15 The opposite figure represents the curve of the function $f : f(x) = 4 - x^2$ in the interval $[-2, 2]$ From the graph find :

- (1) the coordinates of the vertex point.
- (2) the equation of the axis of symmetry.
- (3) the maximum value of the function.



16 If $\frac{a+3b}{3} = \frac{2b+c}{2}$, prove that : $a \propto c$



Demiati Governorate



Answer the following questions : (Calculator is allowed)

First Question :

[a] Choose the correct answer from those given :

1 $\sqrt{25} = \dots\dots\dots$

- (a) 5 (b) -5 (c) ± 5 (d) 625

2 If $f(x) = kx + 8$, $f(2) = \text{zero}$, then $k = \dots\dots\dots$

- (a) 8 (b) 6 (c) 4 (d) -4

3 The range of the values : 7, 3, 6, 9, 5 is $\dots\dots\dots$

- (a) 3 (b) 4 (c) 6 (d) 12

[b] If b is the middle proportional between a and c , prove that : $\frac{a}{c} = \frac{b^2}{c^2}$

Second Question :

[a] Choose the correct answer from those given :

1 If $\frac{x}{5} = \frac{y}{4} = \frac{x+2y}{m}$, then $m = \dots\dots\dots$

- (a) 9 (b) 13 (c) 14 (d) 8

2 $\{3\} \subset \dots\dots\dots$

- (a) (3, 7) (b) $]3, 7[$ (c) $]3, 7]$ (d) $\{3, 7\}$

[3] If the relation $R = \{(1, 3), (2, 5), (4, 3)\}$, then R represents a function where its range is

- (a) $\{1, 2, 3\}$ (b) $\{2, 4, 1, 3, 5\}$ (c) $\{3, 5\}$ (d) $\mathbb{N}$

[b] If $X = \{4, 6, 8, 10\}$, $Y = \{2, 3, 4, 5\}$ and R is a relation from X to Y where " aRb " means " $a = 2b$ " for each $a \in X$, $b \in Y$, write R and represent it by an arrow diagram. Is R a function or not ?

Third Question :

[a] Choose the correct answer from those given :

[1] If the point $(X - 4, 2 - X)$, $X \in \mathbb{Z}$ lies in the third quadrant, then $X = \dots\dots\dots$

- (a) 2 (b) 3 (c) 4 (d) 6

[2] If $X = \{1, 2\}$, $Y = \{3, 4\}$, then $(3, 4) \in \dots\dots\dots$

- (a) $X \times Y$ (b) $Y \times X$ (c) X^2 (d) Y^2

[3] If $a, b, 2, 3$ are proportional quantities, then $\frac{a}{b} = \dots\dots\dots$

- (a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $\frac{4}{3}$ (d) $\frac{3}{4}$

[b] If $y \propto \frac{1}{x}$ and $X = 3$ when $y = 2$

- (1) Write the relation between X and y (2) Find X when $y = 6$

Fourth Question :

[a] If $\frac{5y - 3X}{3y + 5X} = 1$ for all the values of $X \in \mathbb{R}_+$, $y \in \mathbb{R}_+$, **prove that :** $y \propto X$

[b] Find the number that if added to each of the numbers 3, 5, 8 and 12, then they become proportional numbers.

Fifth Question :

[a] Calculate the mean and the standard deviation of the data : 1, 3, 5, 7, 9

[b] Graph the curve of the function $f : f(X) = X^2 - 1$ in the interval $[-2, 2]$ and from the graph find :

- (1) The maximum or the minimum value of f
 (2) The equation of the axis of symmetry of the curve of f



Answer the following questions :

First Group :

► Choose the correct answer :

- 1 If the point $(2, b) \in$ the set of the function f where $f(x) = 3x - 6$, then $b = \dots\dots\dots$
 (a) zero (b) 7 (c) 9 (d) 2
- 2 If $Y \times X = \{(1, 4)\}$, then $X^2 = \dots\dots\dots$
 (a) $\{(1, 16)\}$ (b) $\{(2, 8)\}$ (c) $\{(1, 1)\}$ (d) $\{(4, 4)\}$
- 3 If the point $(3 - x, x - 1)$ is located in the fourth quadrant, where $x \in \mathbb{Z}$, then $x = \dots\dots\dots$
 (a) 4 (b) 3 (c) 2 (d) zero
- 4 If $\frac{a}{3} = \frac{b}{2} = \frac{c}{4} = \frac{2a - 3b + 5c}{5x}$, then $x = \dots\dots\dots$
 (a) 4 (b) 5 (c) 3 (d) 2
- 5 The relation representing the inverse variation between the two variables x and y is $\dots\dots\dots$
 (a) $xy = 7$ (b) $y = x + 5$ (c) $y = 5x$ (d) $\frac{x}{3} = \frac{y}{4}$
- 6 The range of the values : 17, 13, 6, 8 and 15 equals $\dots\dots\dots$
 (a) 3 (b) 8 (c) 11 (d) 5
- 7 If $n(x^2) = 4$, $n(x \times y) = 6$, then $n(y^2) = \dots\dots\dots$
 (a) 2 (b) 3 (c) 4 (d) 9
- 8 $\{7\} \subset \dots\dots\dots$
 (a) $]5, 7[$ (b) $[5, 7[$ (c) $\{5, 7\}$ (d) $(7, 5)$
- 9 The degree of the algebraic term $3x^3y^n$ is the fifth, then $n = \dots\dots\dots$
 (a) 3 (b) 2 (c) 5 (d) 1

Second Group :

► Answer the following questions :

- 10 Two integer numbers, the ratio between them is 3 : 7 and if 5 is subtracted from each of them, the ratio between them becomes 1 : 3. Find the two numbers
- 11 If a varies directly with b , and $a = 20$ when $b = 7$, find :
 (1) The relation between a and b (2) The value of b when $a = 40$

12 Find the mean and standard deviation for the values : 8 , 13 , 20 , 16 , 18 , 21

13 If $X = \{1, 2, 3, 4\}$, $Y = \{3, 6, 9, 12, 15\}$ and R is a relation from X to Y where " aRb " means " $3a = b$ " for all $a \in X, b \in Y$.

(1) Write R and represent it by an arrow diagram.

(2) Show if R is a function or not.

14 If a, b, c and d are proportional quantities , prove that : $\frac{a}{b-a} = \frac{c}{d-c}$

15 If a, b and c are in continued proportion , prove that : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

16 Represent graphically the function $f : f(X) = (X - 2)^2$, where $X \in [-1, 5]$ and from the graph find :

(1) The coordinates of the vertex of the curve.

(2) The equation of the axis of symmetry.

(3) The minimum or maximum value of the function.



El-Fayoum Governorate



Answer the following questions : (Calculator is allowed)

First Question :

Choose the correct answer from the given ones :

1 If $Xy = 3$, then $X \propto \dots\dots\dots$

(a) y

(b) y^2

(c) $\frac{1}{y}$

(d) $\frac{1}{y^3}$

2 $\frac{3^{2X} + 3^{2X} + 3^{2X}}{3^X \times 3^X} = \dots\dots\dots$ (in the simplest form)

(a) 3^{4X}

(b) 3^{2X}

(c) 3

(d) $\frac{1}{3}$

3 If $X = \{4, 5\}$, then $n(X^2) = \dots\dots\dots$

(a) 3

(b) 2

(c) 4

(d) 10

4 If $(2^X, \sqrt{y}) = (1, 1)$, then $X - y = \dots\dots\dots$

(a) zero

(b) 1

(c) -1

(d) ± 1

5 If $f(X) = -3$, then $f(3) + f(-3) = \dots\dots\dots$

(a) 3

(b) 6

(c) zero

(d) -6

6 The range of the values : 7 , 3 , 6 , 9 , 5 is $\dots\dots\dots$

(a) 3

(b) 4

(c) 6

(d) 5

Second Question :

[a] Calculate the standard deviation for the values : 8 , 9 , 7 , 6 , 5

[b] If b is the middle proportional between a and c , prove that : $\left(\frac{b-c}{a-b}\right)^2 = \frac{c}{a}$

Third Question :

[a] If $X = \{1, 4, 5\}$, $Y = \{3, 9, 10, 14\}$ and R is a relation from X to Y , where "aRb" means " $a = \frac{1}{3} b$ " for each $a \in X$, $b \in Y$

(1) Write R and represent it by an arrow diagram.

(2) Is R a function ? And why ?

[b] If $X = \{3\}$, $Y = \{4, 5\}$, $Z = \{5, 6\}$, find :

(1) $(Y \cap Z) \times X$ (2) $(X - Y) \times Z$ (3) $n(X^2)$

Fourth Question :

[a] If $y \propto X$ and $y = 20$ when $X = 4$ find :

(1) The relation between X and y (2) The value of X when $y = 40$

[b] Represent graphically the function $f : f(X) = 3 - X^2$ where $X \in [-3, 3]$, and from the graph find :

(1) The vertex of the curve.

(2) The minimum or maximum value of the function.

Fifth Question :

[a] If $\frac{X}{3} = \frac{y}{4} = \frac{z}{5}$, find the value of : $\frac{2y-z}{3X-2y+z}$

[b] Choose the correct answer from the given ones :

1 The third proportional for the numbers 3 and 6 is

(a) $\frac{1}{2}$

(b) 9

(c) 2

(d) 12

2 If $\frac{a}{b} = \frac{3}{5}$, $5a - 2b = 20$, then $b =$

(a) 3

(b) 5

(c) 15

(d) 20

3 If the point $(X - 3, 5)$ lies on the y-axis , then $X =$

(a) -3

(b) -5

(c) 5

(d) 3



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from those given :

- 1 The algebraic expression : $4X^3 + X^2 + 2X$ is of the degree.
 (a) first (b) second (c) third (d) fourth
- 2 Which of the following relations represents an inverse variation between the two variables X and y ?
 (a) $XY = 7$ (b) $y = X + 7$ (c) $y = 7X$ (d) $\frac{X}{y} = 7$
- 3 is one of the measures of the dispersions.
 (a) The arithmetic mean (b) The mode
 (c) The median (d) The range
- 4 If $X = \{4, 5\}$, then $n(X^2) = \dots\dots\dots$
 (a) 2 (b) 4 (c) 5 (d) 9
- 5 If $2^X = 8$, then $X = \dots\dots\dots$
 (a) 3 (b) 6 (c) 9 (d) 16
- 6 If $X = \{1, 2\}$ and $Y = \{3, 4\}$, then $(3, 4) \in \dots\dots\dots$
 (a) $X \times Y$ (b) $Y \times X$ (c) X^2 (d) Y^2
- 7 If $8a = 2b$, then $\frac{a}{b} = \dots\dots\dots$
 (a) 4 (b) 2 (c) $\frac{1}{2}$ (d) $\frac{1}{4}$
- 8 If $f(X) = X^3 + 1$, then $f(1) + f(-1) = \dots\dots\dots$
 (a) -2 (b) zero (c) 2 (d) 4
- 9 If $f(X) = 2X + c$ and $f(1) = 7$, then $c = \dots\dots\dots$
 (a) 4 (b) 5 (c) 6 (d) 7

Second Group :

► Answer the following questions :

- 10 If $X = \{1, 3, 5\}$, $Y = \{1, 2, 3, 4, 5, 6\}$ and R is a relation from X to Y where " aRb " means " $a + b = 7$ " for each $a \in X$, $b \in Y$, write R and represent it by an arrow diagram. Is R a function ? And why ?
- 11 If $\frac{X}{2} = \frac{y}{3} = \frac{z}{4} = \frac{3X + 2y - z}{k}$, find the value of k

- 12 If $y \propto X^2$ and $y = 36$ when $X = 3$, find the relation between y and X , then find the value of y when $X = 2$
- 13 Find the number which if it is subtracted from the antecedent of the ratio $15 : 13$ and is added to its consequent, it will be $3 : 4$
- 14 Find the arithmetic mean and the standard deviation of the values :
12 , 13 , 16 , 18 and 21
- 15 If b is the middle proportional between a and c , prove that : $\frac{a+2b}{b+2c} = \frac{a-b}{b-c}$
- 16 Represent graphically the function $f : f(X) = 3 - X^2$, taking $X \in [-2, 2]$ and from the graph find the coordinates of the vertex of the curve, the maximum or minimum value of the function and the equation of the axis of symmetry.



El-Menia Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from those given :

- 1 $a^{\text{zero}} = \dots\dots\dots$ where $a \neq \text{zero}$
 (a) zero (b) 1 (c) a (d) -1
- 2 The middle proportional between a and c is $\dots\dots\dots$
 (a) $\sqrt{a+c}$ (b) $\frac{a+c}{2}$ (c) $\pm\sqrt{ac}$ (d) ac
- 3 The difference between the greatest value and the smallest value in a set of values is called $\dots\dots\dots$
 (a) the range. (b) the arithmetic mean.
 (c) the median. (d) the standard deviation.
- 4 Half of the number 2^{20} is $\dots\dots\dots$
 (a) 2^{10} (b) 1^{20} (c) 2^{21} (d) 2^{19}
- 5 If the relation $R = \{(1, 3), (2, 5), (4, 3)\}$ represents a function, then its range is $\dots\dots\dots$
 (a) $\{1, 2, 4\}$ (b) $\{2, 4, 1, 3, 5\}$ (c) $\{3, 5\}$ (d) $\mathbb{N}$
- 6 The linear function defined by the rule $y = 2X - 1$ is represented by a straight line intersecting the y -axis at the point $\dots\dots\dots$
 (a) $(0, 1)$ (b) $(0, -1)$ (c) $(1, 0)$ (d) $(-1, 0)$

- 7 If $(3, 5) \in \{3, 6\} \times \{x, 8\}$, then $x = \dots\dots\dots$
 (a) 8 (b) 6 (c) 5 (d) 3
- 8 If $f(x) = x^2 - x + 3$, then $f(-2) = \dots\dots\dots$
 (a) -2 (b) -1 (c) 5 (d) 9
- 9 If $\frac{x}{3} = \frac{y}{4} = \frac{x+y}{k}$, then $k = \dots\dots\dots$
 (a) 1 (b) 6 (c) 7 (d) 12

Second Group :

► Answer the following questions :

- 10 If $X = \{1, 2, 3\}$, $Y = \{1, 4, 6, 9\}$ and R is a relation from X to Y , where " aRb " means " $a = \sqrt{b}$ " for each $a \in X$, $b \in Y$, write the relation R and represent it by an arrow diagram. Mention if R is a function from X to Y or not.
- 11 If $y \propto \frac{1}{x}$, and $y = 3$ when $x = 2$, find the relation between y and x
- 12 Find the number which if it is added to the two terms of the ratio $7 : 11$, it will be $2 : 3$
- 13 If $\frac{x}{y} = \frac{2}{3}$, find the value of : $\frac{3x + 2y}{6y - x}$
- 14 If b is the middle proportional between a and c , prove that : $\frac{a-b}{a} = \frac{a-c}{a+b}$
- 15 Calculate the standard deviation for the values : 12, 13, 16, 18 and 21
- 16 Represent graphically the function $f : f(x) = (x-2)^2$, taking $x \in [-1, 5]$ and from the graph, deduce :
 (1) The coordinates of the vertex of the curve.
 (2) The equation of the line of symmetry.
 (3) The maximum or minimum value of the function where $x \in \mathbb{R}$

16

Assiut Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer :

- 1 If $f(x) = 2x + 7$, then $f(1) = \dots\dots\dots$
 (a) 7 (b) 8 (c) 9 (d) 10
- 2 If $f(x) = 7$, then $f(-8) = \dots\dots\dots$
 (a) -8 (b) -7 (c) 8 (d) 7

- 3 If $X = \{1\}$, $Y = \{2\}$, then $n(X \cap Y) = \dots\dots\dots$
 (a) $\{1, 2\}$ (b) $\{(1, 2)\}$ (c) $\emptyset$ (d) zero
- 4 The middle proportional between 4 , 9 is $\dots\dots\dots$
 (a) 6 (b) - 6 (c) ± 6 (d) 36
- 5 If $y \propto X$ and $y = 6$ when $X = 3$, then $y = \dots\dots\dots$ when $X = 4$
 (a) 4 (b) 6 (c) 8 (d) 12
- 6 If $\sum (X - \bar{X})^2 = 36$, for a set of values whose number equals 9 , then $\sigma = \dots\dots\dots$
 (a) 4 (b) 2 (c) ± 4 (d) ± 2
- 7 The solution set of the equation : $X^2 = 49$, where $X \in \mathbb{N}$ is $\dots\dots\dots$
 (a) $\{7\}$ (b) $\{7, -7\}$ (c) $\{-7\}$ (d) $\emptyset$
- 8 If the mode of the values : 3 , $a + 1$, 4 is 3 , then $a = \dots\dots\dots$
 (a) 3 (b) 2 (c) 1 (d) zero
- 9 If $n(X^2) = 4$, $n(Y) = 3$, then $n(X \times Y) = \dots\dots\dots$
 (a) 4 (b) 6 (c) 8 (d) 12

Second Group :

► Answer the following questions :

- 10 If $\frac{a}{b} = \frac{c}{d}$, prove that : $\frac{a+b}{b} = \frac{c+d}{d}$
- 11 Two integer numbers , the ratio between them is 2 : 3 , if you add to the first 7 and subtract from the second 12 , the ratio between them becomes 5 : 3 Find the two numbers.
- 12 Calculate the standard deviation for the data : 72 , 53 , 61 , 70 , 59
- 13 If $X = \{0, 1, 4, 7\}$, $Y = \{1, 3, 5, 6\}$, R is a relation from X to Y where " aRb " means " $a + b < 6$ " for each $a \in X$, $b \in Y$, write R and represent it by an arrow diagram.
Is R a function or not ? Tell the reason.
- 14 Represent graphically the function $f : f(X) = X^2 + 2X + 1$, $X \in [-4, 2]$
From the graph deduce :
 (1) The equation of the axis of symmetry.
 (2) The maximum value or the minimum value of the function.
- 15 If b is the middle proportional between a and c , prove that : $\frac{a+b+c}{a^{-1} + b^{-1} + c^{-1}} = b^2$
- 16 If the relation between the distance (d) in (meters) and time (t) in (seconds) is $d = 9.8 t$
 (1) Determine the kind of variation between d and t .
 (2) Find the value of d when $t = 2$ seconds.



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer :

- 1 If $a, 3, 4, b$ are proportional quantities, then $\frac{a}{b} = \dots\dots\dots$
 (a) 3 (b) 2 (c) 4 (d) 6
- 2 If the standard deviation of the values : $X + 2, 5, y - 2$ equals zero, then $X + y = \dots\dots\dots$
 (a) 9 (b) 5 (c) 10 (d) 4
- 3 If the straight line representing the function $f : \mathbb{R} \longrightarrow \mathbb{R}, f(X) = aX - 5$ passes through the point $(2, 3)$, then the value of $a = \dots\dots\dots$
 (a) 8 (b) 4 (c) 2 (d) 6
- 4 If $y^2 + 4X^2 = 4Xy$, then $\dots\dots\dots$
 (a) $y \propto X$ (b) $y \propto X^2$ (c) $y \propto \frac{1}{X}$ (d) $y \propto \frac{1}{X^2}$
- 5 The following functions are polynomial except the function f where $f(X) = \dots\dots\dots$
 (a) $X + 3$ (b) $\sqrt{2}X + 3$ (c) $X\left(X + \frac{1}{X}\right)$ (d) $X^2(X + 4)$
- 6 If $(X - 1, 11) = (8, y + 3)$, then $\sqrt{X + 2y} = \dots\dots\dots$
 (a) 5 (b) ± 5 (c) $\sqrt{17}$ (d) 25
- 7 The product of the two square roots of the number 16 equals $\dots\dots\dots$
 (a) zero (b) -8 (c) -16 (d) 8
- 8 If $X \times Y = \{(2, 3)\}$, then $X^2 = \dots\dots\dots$
 (a) $\{(4, 9)\}$ (b) $\{(4, 3)\}$ (c) $\{(2, 2)\}$ (d) $\{(2, 9)\}$
- 9 If $(X + 5)(X - 5) = X^2 + k$, then $k = \dots\dots\dots$
 (a) -10 (b) -25 (c) 25 (d) 10

Second Group :

► Answer the following questions :

- 10 Calculate the arithmetic mean and the standard deviation of the values :

15, 30, 21, 18, 16

- 11 Represent graphically the curve of the function $f : f(X) = 4 - X^2$, taking $X \in [-3, 3]$ and from the graph deduce :

- (1) The equation of the axis of symmetry.
- (2) The maximum or minimum value of the function f

12 If $X = \{1, 3, 4, 5\}$, $Y = \{1, 2, 3, 4, 5, 6\}$ and R is a relation from X to Y where "aRb" means " $a + b = 7$ " for each $a \in X, b \in Y$

(1) Write R and represent it by an arrow diagram.

(2) Is R a function or not? And why?

13 If b is the middle proportional between a and c , prove that: $\frac{2c^2 - 3b^2}{2b^2 - 3a^2} = \frac{c}{a}$

14 If $\frac{x}{2} = \frac{y}{3} = \frac{z}{4}$, prove that: $\frac{2x - y + 5z}{3y - x} = 3$

15 If $y \propto \frac{1}{x}$, and $y = 4$ when $x = 3$, find:

(1) The relation between y and x

(2) The value of x when $y = 6$

16 Find the number that if we subtract three times of it from each of the two terms of the ratio $49 : 69$, it becomes $2 : 3$

18

Qena Governorate



Answer the following questions : (Calculator is permitted)

First Group :

► Choose the correct answer from the given answers :

1 The function $f : f(x) = 2x$ is represented graphically by a straight line passing through the point

- (a) (2, 2) (b) (1, 1) (c) (0, 0) (d) (3, 2)

2 If $y^2 + 4x^2 = 4xy$, then $y \propto$

- (a) x (b) x^2 (c) $\frac{1}{x}$ (d) $\frac{1}{x^2}$

3 $\frac{\sqrt{5}}{\sqrt{5}-1} - \frac{1}{\sqrt{5}-1} =$

- (a) zero (b) 1 (c) $\sqrt{5}-1$ (d) -1

4 If $X \times Y = \{(2, 3)\}$, then $Y^2 =$

- (a) $\{(2, 2)\}$ (b) $\{(3, 3)\}$ (c) $\{(3, 2)\}$ (d) $\{(4, 9)\}$

5 If $3^{x-2} = 1$, then $x =$

- (a) zero (b) 1 (c) 2 (d) 3

6 The function $f : f(x) = 5$ is represented graphically by a straight line parallel to the x -axis and intersecting the y -axis at the point

- (a) (0, 5) (b) (5, 5) (c) (5, 0) (d) (5, -5)

- 7 If the dispersion of the values : $X + 1$ and $y + 4$ equals zero , then $X - y = \dots\dots\dots$
 (a) -1 (b) -4 (c) 3 (d) 4
- 8 The function $f : f(X) = (X - 5)^2 + 7X$ is a polynomial function of the $\dots\dots\dots$ degree.
 (a) zero (b) first (c) second (d) third
- 9 If $\frac{a}{2} = \frac{b}{5} = \frac{2a+b}{k}$, then the value of $k = \dots\dots\dots$
 (a) 3 (b) 5 (c) 7 (d) 9

Second Group :

► Answer the following questions :

- 10 If b is the middle proportional between a and c , **prove that** : $\left(\frac{b-c}{a-b}\right)^2 = \frac{c}{a}$
- 11 If $X = \{1, 3, 5\}$ and R is a relation on X where $R = \{(a, 3), (5, 3), (b, 5)\}$, and if R represents a function , **then find** :
 (1) The range of the function.
 (2) The value of the expression $(a - b)$
- 12 Represent graphically the function $f : f(X) = 2X - X^2$, take $X \in [-1, 3]$ and from the drawing deduce the coordinates of the vertex of the curve , the maximum or the minimum value of the function and the equation of the symmetry axis of the curve.
- 13 If $y \propto \frac{1}{X^2}$ and $y = 5$ when $X = 4$, find the relation between X and y , then find the value of y when $X = 2$
- 14 If a, b, c, d are proportional , **prove that** : $\frac{3a-2c}{3b-2d} = \frac{5a+3c}{5b+3d}$
- 15 The following frequency distribution shows the number of children of 100 families :

Number of children	0	1	2	3	4	Total
Number of families	8	16	50	20	6	100

Calculate the standard deviation to the previous data.

- 16 If $\frac{X}{y} = \frac{3}{5}$, **find the value of the expression** : $\frac{2X+y}{X+3y}$



Answer the following questions :

First Group :

► Choose the correct answer :

- 1 If $x \in \mathbb{R}$, $2 < x < 4$, then $3x - 1 \in \dots\dots\dots$
 - (a) $[6, 12]$
 - (b) $]6, 12[$
 - (c) $]5, 11[$
 - (d) $]7, 11[$
- 2 If $\frac{5}{4} + \frac{5}{x} = \frac{5}{2}$, then $x = \dots\dots\dots$
 - (a) 5
 - (b) $\frac{5}{2}$
 - (c) $\frac{5}{4}$
 - (d) 4
- 3 If $X = \{5\}$, $Y = \{0, 2\}$, then $n(X \times Y) = \dots\dots\dots$
 - (a) 10
 - (b) 0
 - (c) 2
 - (d) $\{(5, 2)\}$
- 4 If $f(x) = 5$, then $f(5) + f(-5) = \dots\dots\dots$
 - (a) 0
 - (b) 10
 - (c) 5
 - (d) -5
- 5 If $f(x) = x(x-1)^2$, then the function's degree is the $\dots\dots\dots$
 - (a) first.
 - (b) second.
 - (c) third.
 - (d) fourth.
- 6 If the relation $R = \{(1, 4), (3, 4), (2, 4)\}$ is a function, then the domain = $\dots\dots\dots$
 - (a) $\{1, 2, 3\}$
 - (b) $\{4\}$
 - (c) $\{2, 4, 1\}$
 - (d) $\{4, 3, 1\}$
- 7 If $\frac{a}{b} = \frac{3}{5}$, then $\frac{7a+9b}{4a+2b} = \dots\dots\dots$
 - (a) 3
 - (b) $\frac{5}{3}$
 - (c) 5
 - (d) $\frac{3}{5}$
- 8 If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 2$, then $y = \dots\dots\dots$ when $x = 1.5$
 - (a) 2
 - (b) 4
 - (c) 3
 - (d) 2.5
- 9 The range of the values : 6, 9, 3, 5, 7 equals $\dots\dots\dots$
 - (a) 3
 - (b) 4
 - (c) 6
 - (d) 5

Second Group :

► Answer each of the following :

- 10 If $y \propto x^2$, and $y = 20$ when $x = 2$, find :
 - (1) The relation between x and y
 - (2) The value of y when $x = \frac{1}{3}$
- 11 If $\frac{x}{3} = \frac{y}{4} = \frac{z}{6} = \frac{z-2y+4x}{k+5}$, find : k

- 12 If a, b, c and d are in continued proportion, prove that : $\frac{a}{b+d} = \frac{c^3}{c^2d+d^3}$
- 13 Find the number that if subtracted from each of 3, 5, 6 and 14, they become proportional.
- 14 Represent graphically the quadratic function f where $f(x) = (x-1)^2, x \in \mathbb{R}$ where $x \in [-1, 3]$ and find :
- (1) The minimum value. (2) The equation of the axis symmetry.
- 15 If $X = \{1, -2, 3\}, Y = \{-8, -2, 2, 8\}$ and R is a relation from X to Y where " aRb " means " $2a - 4 = b$ " for each $a \in X, b \in Y$
- (1) Write R and represent it by an arrow diagram.
(2) Show that R is a function and find the range.
- 16 Calculate the mean and standard deviation of the values : 11, 13, 16, 18, 22



North Sinai Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from those given :

- 1 If $n(X^2) = 25, n(Y) = 3$, then $n(X \times Y) = \dots\dots\dots$
- (a) 3 (b) 5 (c) 12 (d) 15
- 2 $[2, 8] - \{8\} = \dots\dots\dots$
- (a) $[2, 8[$ (b) $]2, 8[$ (c) $\{8\}$ (d) $\{2, 8\}$
- 3 The range of the values : 8, 4, 6, 7 and 9 is $\dots\dots\dots$
- (a) 4 (b) 5 (c) 8 (d) 9
- 4 The middle proportional between 3, 12 is $\dots\dots\dots$
- (a) 3 (b) 6 (c) ± 6 (d) -6
- 5 If $xy = 9$, then $y \propto \dots\dots\dots$
- (a) $\frac{1}{x}$ (b) $x-9$ (c) x (d) $x+9$
- 6 If $2^x = 8^3$, then $x = \dots\dots\dots$
- (a) 2 (b) 3 (c) 6 (d) 9
- 7 If $(4, 1) \in \{2, x\} \times \{1, 7\}$, then $x = \dots\dots\dots$
- (a) 1 (b) 2 (c) 4 (d) 7

- 8 If $f(x) = x + 2b$, $f(3) = 15$, then $b = \dots\dots\dots$
 (a) 2 (b) 3 (c) 6 (d) 15
- 9 If $(a^3 + 5, 6) = (-3, b + 4)$, then $a + b = \dots\dots\dots$
 (a) zero (b) 2 (c) 5 (d) 6

Second Group :

► Answer the following questions :

- 10 If $5a = 4b$, find the value of : $\frac{2a+b}{4a+2b}$ in the simplest form.
- 11 If $X = \{1, 2, 3\}$, $Y = \{1, 4, 8, 10, 12\}$, R is a relation from X to Y where " aRb " means " $a = \frac{1}{4}b$ " for all $a \in X, b \in Y$
 (1) Write R and represent it by an arrow diagram.
 (2) Show that R is a function and write its range.
- 12 Graph the curve of the function $f : f(x) = (x - 4)^2$ where $x \in [1, 7]$
From the graph find :
 (1) The coordinates of the vertex point of the curve.
 (2) The equation of the axis of symmetry and the minimum value of the function.
- 13 If b is the middle proportional between a, c , prove that : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{b^2}{c^2}$
- 14 If $y \propto x$ where $y = 2$ at $x = 8$, write the relation between x and y , then find the value of y when $x = 12$
- 15 Find the number which if added to each of the two terms of the ratio $5 : 11$, it becomes $3 : 5$
- 16 Calculate the arithmetic mean and the standard deviation of the values :
 10, 11, 14, 16, 19

Model Examinations of the School Book on Trigonometry and Geometry



Model

1

Answer the following questions :

1 Choose the correct answer from those given :

1 $\tan 45^\circ = \dots\dots\dots$

(a) 1

(b) $2\sqrt{2}$

(c) $\frac{1}{2}$

(d) $\sqrt{2}$

2 If $\sin X = \frac{1}{2}$, X is an acute angle, then $m(\angle X) = \dots\dots\dots$

(a) 45°

(b) 60°

(c) 30°

(d) 90°

3 The distance between the two points $(3, 0)$ and $(0, -4)$ equals $\dots\dots\dots$ length units.

(a) 4

(b) 5

(c) 6

(d) 7

4 If $X + y = 5$, $kX + 2y = 0$ are perpendicular, then $k = \dots\dots\dots$

(a) -2

(b) -1

(c) 1

(d) 2

5 If $A(5, 7)$, $B(1, -1)$, then the midpoint of $\overline{AB}$ is $\dots\dots\dots$

(a) $(2, 3)$

(b) $(3, 3)$

(c) $(3, 2)$

(d) $(3, 4)$

6 The equation of the straight line which passes through the point $(3, -5)$ and parallel to y -axis is $\dots\dots\dots$

(a) $X = 3$

(b) $y = -5$

(c) $y = 2$

(d) $X = -5$

2 [a] Without using calculator, prove that : $\sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$

[b] Prove that the points $A(-3, -1)$, $B(6, 5)$ and $C(3, 3)$ are collinear.

3 [a] If $4 \cos 60^\circ \sin 30^\circ = \tan X$, find the value of X , where X is the measure of an acute angle.

[b] If the midpoint of $\overline{AB}$ is $C(6, -4)$ where $A(5, -3)$, find the point B

4 [a] If the straight line L_1 passes through the points $(3, 1)$, $(2, k)$ and the straight line L_2 makes with the positive direction of the X -axis an angle of measure 45° , find the value of k if $L_1 \parallel L_2$

[b] ABC is a right-angled triangle at C , $AC = 6$ cm., $BC = 8$ cm.

Find : 1 $\cos A \cos B - \sin A \sin B$

2 $m(\angle B)$

- 5 [a] Find the equation of the straight line whose slope is 2 and passes through the point (1, 0)
- [b] Prove that the points A (3, -1), B (-4, 6) and C (2, -2) which belongs to an orthogonal Cartesian coordinates plane lie on the circle whose centre is M (-1, 2). Find the circumference of the circle.

Model 2

Answer the following questions :

- 1 Choose the correct answer from those given :

- 1 $2 \sin 30^\circ \tan 60^\circ = \dots\dots\dots$
- (a) $\sqrt{3}$ (b) 3 (c) $\frac{\sqrt{3}}{3}$ (d) $\frac{1}{2}$
- 2 The equation of the straight line which passes through the point (-2, -3) and parallel to X-axis is $\dots\dots\dots$
- (a) $X = -2$ (b) $X = -3$ (c) $y = -2$ (d) $y = -3$
- 3 If $\cos X = \frac{\sqrt{3}}{2}$, X is the measure of an acute angle, then $\sin 2X = \dots\dots\dots$
- (a) 1 (b) $\frac{\sqrt{3}}{2}$ (c) -2 (d) $\frac{1}{\sqrt{3}}$
- 4 A circle of centre at the origin point and its radius length is 2 length units, which of the following points belongs to the circle ?
- (a) (1, -2) (b) $(-2, \sqrt{5})$ (c) $(\sqrt{3}, 1)$ (d) (0, 1)
- 5 The perpendicular distance between the two straight lines : $X - 2 = 0$, $X + 3 = 0$ equals $\dots\dots\dots$ length units.
- (a) 1 (b) 5 (c) 2 (d) 3
- 6 If $\frac{-3}{2}$, $\frac{6}{k}$ are the slopes of two parallel straight lines, then k = $\dots\dots\dots$
- (a) 6 (b) -4 (c) $\frac{3}{2}$ (d) 2

- 2 [a] If $\cos E \tan 30^\circ = \cos^2 45^\circ$, find : $m(\angle E)$, E is an acute angle.

[b] Show the type of the triangle whose vertices are A (3, 3), B (1, 5) and C (1, 3) due to its side lengths.

- 3 [a] Find the equation of the straight line which passes through the points (1, 3) and (-1, -3) and prove that it is passing through the origin point.

[b] If the point (3, 1) is the midpoint of (1, y), (X, 3), find the point (X, y)

- 4 [a] Find the equation of the straight line which intercepts from the two axes two positive parts of lengths 1 and 4 for X and y axes respectively and find its slope.

[b] ABC is a right-angled triangle at B, $AC = 10$ cm. and $BC = 8$ cm.

Prove that : $\sin^2 A + 1 = 2 \cos^2 C + \cos^2 A$

- 5 [a] Prove that the straight line which passes through the points $(-1, 3)$ and $(2, 4)$ is parallel to the straight line : $3y - x - 1 = 0$

[b] ABCD is a trapezium, $\overline{AD} \parallel \overline{BC}$, $m(\angle B) = 90^\circ$, $AB = 3$ cm., $BC = 6$ cm. and $AD = 2$ cm.

Find : the length of $\overline{DC}$ and the value of $\cos(\angle BCD)$

2026

Governorates' Examinations on Trigonometry and Geometry

**1****Cairo Governorate**

Answer the following questions : (*Calculator is allowed*)

First Group :

► **Choose the correct answer from those given :**

- 1 The sum of measures of the interior angles of the triangle equals°
(a) 360 (b) 270 (c) 180 (d) 90
- 2 $\sin 30^\circ =$
(a) $\sqrt{2}$ (b) $\frac{1}{2}$ (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{\sqrt{2}}$
- 3 The slope of the straight line that is parallel to the X -axis equals
(a) -1 (b) zero (c) 1 (d) 2
- 4 If $m(\angle A) + m(\angle B) = 90^\circ$, $\sin A = 0.6$, then $\cos B =$
(a) 0.8 (b) 0.75 (c) 0.6 (d) 1.3
- 5 The midpoint of $\overline{AB}$ where $A(3, 5)$, $B(1, -5)$ is
(a) (4, 0) (b) (8, 0) (c) (2, 5) (d) (2, 0)
- 6 The numbers that can be the lengths of sides of a right-angled triangle are
(a) 5, 4, 3 (b) 3, 4, 6 (c) 5, 13, 11 (d) 6, 8, 12
- 7 If $2X = 5 + \tan 45^\circ$, then $X =$
(a) 3 (b) 4 (c) 5 (d) 6
- 8 The slope of the straight line that is perpendicular to the straight line whose equation is $y = 7X + 8$ equals
(a) 8 (b) 7 (c) $-\frac{1}{7}$ (d) -8
- 9 If ABC is a right-angled triangle at B where $AB = 3$ cm., $BC = 4$ cm., then $\tan C =$
(a) $\frac{4}{3}$ (b) $\frac{3}{5}$ (c) $\frac{3}{5}$ (d) $\frac{3}{4}$

Second Group :

► **Answer the following questions showing the steps of solution :**

- 10 Prove that the straight line passing through the two points $(5, 7)$, $(4, 5)$ is parallel to the straight line whose equation is $y - 3 = 2X$

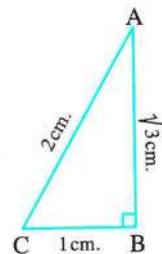
- 11 Find the equation of the straight line that passes through the point $(1, 3)$ and makes an angle of measure 45° with the positive direction of the X -axis.
- 12 If the straight line whose equation is $y = 2x + c$ (where c is a constant) passes through the point $(2, 5)$, find the length of the intercepted part of the y -axis.

13 In the opposite figure :

ABC is a right-angled triangle at B
, AC = 2 cm. , BC = 1 cm. and $AB = \sqrt{3}$ cm.

(1) Find : $m(\angle A)$

(2) Prove that : $1 + \cos C = 2 \cos^2 A$



- 14 ABCD is a square where A $(0, 0)$, B $(3, y)$, if its side length is 5 units , find the positive value of y

- 15 Find the value of : $\sin 30^\circ \cos 60^\circ - \tan^2 60^\circ + \cos^2 30^\circ$

- 16 Prove that the points A $(1, 1)$, B $(4, 2)$ and C $(7, 3)$ are collinear



Giza Governorate



Answer the following questions :

First Group :

► Choose the correct answer :

- 1 $4 \sin 45^\circ \cos 45^\circ = \dots\dots\dots$
(a) 4 (b) $\sqrt{2}$ (c) 2 (d) 1
- 2 The length of the side opposite to the angle of measure 30° in the right-angled triangle equals $\dots\dots\dots$ the length of the hypotenuse.
(a) quarter (b) half (c) double (d) third
- 3 The distance between the point $(-4, -3)$ and the X -axis equals $\dots\dots\dots$ length unit.
(a) 4 (b) -4 (c) 5 (d) 3
- 4 If $\cos 4X = \frac{1}{2}$ where $4X$ is the measure of an acute angle , then $X = \dots\dots\dots^\circ$
(a) 15 (b) 30 (c) 45 (d) 60
- 5 The straight line whose equation is : $2x - 3y + 7 = 0$ is perpendicular to the straight line whose slope equals $\dots\dots\dots$
(a) $\frac{2}{3}$ (b) $-\frac{3}{2}$ (c) $\frac{3}{2}$ (d) $-\frac{2}{3}$

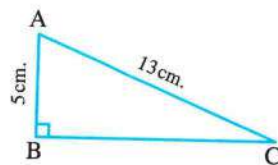
- 6 If the measures of two angles of a triangle are 70° and 50° , then the number of its axes of symmetry equals
- (a) zero (b) 1 (c) 2 (d) 3
- 7 If ABC is a right-angled triangle at B and $AB = BC$, then $\sin C = \dots\dots\dots$
- (a) $\frac{\sqrt{3}}{2}$ (b) $\frac{\sqrt{2}}{2}$ (c) 1 (d) $\frac{1}{2}$
- 8 If A (0, 4), B (-3, 0) and $\overrightarrow{AB} \parallel \overrightarrow{CD}$, then the slope of $\overrightarrow{CD}$ equals
- (a) $\frac{3}{4}$ (b) $-\frac{3}{4}$ (c) $-\frac{4}{3}$ (d) $\frac{4}{3}$
- 9 If $\sin A = \cos B$ where A and B are two acute angles, then $m(\angle A) + m(\angle B) = \dots\dots\dots^\circ$
- (a) 45 (b) 60 (c) 90 (d) 180

Second Group :

► Answer the following questions :

10 In the opposite figure :

ABC is a right-angled triangle at B where $AB = 5$ cm.
and $AC = 13$ cm. **Find :**



- (1) The length of $\overline{BC}$
- (2) The value of : $13 \cos A - 12 \tan C$
- 11 Prove that the points A (4, 3), B (1, 1) and C (-5, -3) are collinear.
- 12 If the point C (4, y) is the midpoint of $\overline{AB}$ where A (x, -3) and B (6, 5), then find the value of : $x - y$
- 13 If $2 \sin x = 4 \cos 30^\circ - \tan 60^\circ$ where x is the measure of an acute angle, then find the value of : x
- 14 If the straight line which passes through the two points (3, 1) and (5, k) parallel to the straight line whose equation is : $y = x + 2$, then find the value of : k
- 15 If the straight line whose slope equals 2 passes through the point (-1, 3), then find :
- (1) The equation of the straight line.
- (2) The coordinates of its intersection point with the y-axis.
- 16 Prove that the points A (0, 1), B (4, 5), C (1, 8) and D (-3, 4) are the vertices of the rectangle ABCD



Answer the following questions : (Calculator is allowed)

First Group :

► **Choose the correct answer from those given :**

- 1 The distance between the point $(-4, 3)$ and the y-axis equals length unit.
(a) -4 (b) 2 (c) 4 (d) 7
- 2 The volume of the cube whose edge length is 8 cm. equals cm^3 .
(a) 2 (b) 32 (c) 64 (d) 512
- 3 The sum of the measures of all interior angles of any quadrilateral is $^\circ$.
(a) 90 (b) 180 (c) 360 (d) 540
- 4 If ABC is a right-angled triangle at B , then $\sin A + \cos C =$
[where $m(\angle A) \neq m(\angle C)$]
(a) $2 \cos A$ (b) $2 \sin C$ (c) $2 \sin A$ (d) $2 \tan A$
- 5 If $\tan 3X = \sqrt{3}$ where $3X$ is the measure of an acute angle, then $X =$ $^\circ$.
(a) 20 (b) 30 (c) 45 (d) 60
- 6 ABC is an isosceles triangle and right at B , then $\tan A =$
(a) 1 (b) $\frac{1}{\sqrt{2}}$ (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{2}$
- 7 If $A = (-2, 5)$, $B = (-2, -1)$, then the midpoint of $\overline{AB}$ is
(a) $(-2, 2)$ (b) $(-3, -2)$ (c) $(0, -2)$ (d) $(2, 3)$
- 8 Two perpendicular straight lines whose slopes are $\frac{k}{2}$, $-\frac{2}{3}$, then $k =$
(a) $-\frac{4}{3}$ (b) -3 (c) 3 (d) $-\frac{1}{3}$
- 9 ABC is a right-angled triangle at B , $AB = 6$ cm., $m(\angle C) = 30^\circ$, then the length of $\overline{BC} =$ cm.
(a) 12 (b) $6\sqrt{3}$ (c) 6 (d) 3

Second Group :

► **Answer the following questions :**

- 10 Without using the calculator, find the value of X , if $\tan X^\circ = 4 \sin 60^\circ \sin 30^\circ$
where X is the measure of an acute angle.
- 11 Prove that the straight line passing through the two points $(-3, -2)$, $(4, 5)$ is parallel to the straight line that makes with the positive direction of the X -axis an angle of measure 45°

12 Prove that the points A (3 , - 1) , B (- 4 , 6) , C (2 , - 2) lie on one circle whose centre is M (- 1 , 2) , then find its circumference. ($\pi = 3.14$)

13 If C is the midpoint of $\overline{AB}$, A (- 3 , y) , B (9 , 11) , C (x , - 3) , **find** : $x + y$

14 Find the equation of the straight line passing through the point (- 2 , 4) and perpendicular to the straight line whose equation is $2x - 3y + 6 = 0$

15 Prove that the points A (- 2 , 5) , B (3 , 3) , C (- 4 , 2) and D (- 9 , 4) are the vertices of a parallelogram.

16 In the opposite figure :

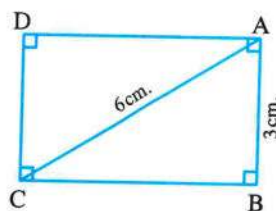
ABCD is a rectangle in which

AB = 3 cm. , AC = 6 cm.

Find :

(1) $m(\angle ACB)$

(2) The area of the rectangle ABCD



El-Kalyoubia Governorate



Answer the following questions :

First Group :

► **Choose the correct answer :**

1 The sum of the measures of the interior angles of the pentagon equals°

(a) 540

(b) 360

(c) 180

(d) 90

2 The triangle whose side lengths are 3 cm. , $(x + 1)$ cm. , 7 cm. becomes an isosceles triangle when $x =$

(a) 1

(b) 2

(c) 6

(d) 7

3 If $\tan x = \frac{1}{\sqrt{3}}$, where x is the measure of an acute angle , then $x =$ °

(a) 15

(b) 30

(c) 45

(d) 60

4 In $\triangle ABC$, if $m(\angle B) = 90^\circ$, then $\sin A + \cos C =$

(a) $2 \sin C$

(b) $2 \cos A$

(c) $2 \sin A$

(d) $\tan B$

5 If $\sin 2x = \frac{1}{2}$, where $2x$ is the measure of an acute angle , then $x =$ °

(a) 15

(b) 30

(c) 45

(d) 60

6 In the opposite figure :

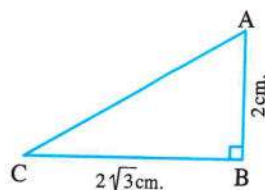
$m(\angle C) =$ °

(a) 30

(b) 60

(c) 80

(d) 90



- 7 If y-axis bisects $\overline{AB}$ where A (5 , 2) , B (X , 7) , then X =
- (a) - 2 (b) - 5 (c) - 7 (d) - 9
- 8 The equation of the straight line whose slope is 2 and passes through the origin point is
- (a) X = 2 (b) y = 2 (c) y = 2 X (d) y = X
- 9 If the origin point is the centre of a circle of a diameter 4 length unit , which of the following points belongs to the circle ?
- (a) (4 , 0) (b) (0 , - 4) (c) (2 , 2) (d) $(\sqrt{3}, 1)$

Second Group :

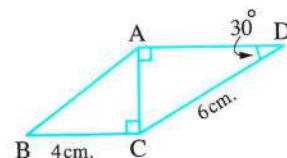
► Answer the following questions :

10 In the opposite figure :

$$m(\angle D) = 30^\circ, m(\angle CAD) = m(\angle ACB) = 90^\circ$$

$$, BC = 4 \text{ cm.}, CD = 6 \text{ cm.}$$

Find : $\tan B$



- 11 If $2 \sin X = \tan^2 45^\circ \tan 60^\circ$, then find the value of X , where X is the measure of an acute angle.
- 12 Prove that $\triangle ABC$ is an isosceles triangle if A (0 , 0) , B (3 , 4) and C (- 4 , 3)
- 13 If A (X , 2) , B (2 , 3) , C (- 4 , 1) and D (- 1 , 2) and $\overrightarrow{AB} \parallel \overrightarrow{CD}$, find the value of : X
- 14 Find the measure of the angle formed by the straight line L with the positive direction of the X-axis if this straight line L is perpendicular to the straight line passing through the two points (- 2 , 5) , (4 , - 1)
- 15 Find the equation of the straight line which passes through the point (6 , 2) and is parallel to the straight line whose slope equals 3
- 16 If C is the midpoint of $\overline{AB}$ where A (6 , y) , B (X , 5) and C (5 , 3) , find the value of : X + y



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from those given :

- 1 $\sqrt{2} \cos 45^\circ \cos 30^\circ = \dots\dots\dots$
 (a) $\sin 60^\circ$ (b) $\tan 30^\circ$ (c) $\sin 30^\circ$ (d) $2 \sin 30^\circ$
- 2 If ABCD is a square , A (- 1 , 4) , C (1 , 6) , then its area = $\dots\dots\dots$ square units.
 (a) 8 (b) 16 (c) 4 (d) $\sqrt{2}$
- 3 ABCD is a quadrilateral where $\sin A = \cos 2A$, $m(\angle B) = 150^\circ$, $m(\angle C) = 50^\circ$, then $m(\angle D) = \dots\dots\dots$
 (a) 120° (b) 100° (c) 130° (d) 150°
- 4 If the straight line $4y = aX + 3$ makes with the two axes in the first quadrant an isosceles triangle , then $a = \dots\dots\dots$
 (a) $\frac{3}{4}$ (b) $\frac{4}{3}$ (c) 4 (d) - 4
- 5 The straight line which passes through the point (5 , 4) and is parallel to the y-axis , its equation is $\dots\dots\dots$
 (a) $X = 5$ (b) $y = 4$ (c) $X = - 5$ (d) $y = - 4$
- 6 The point which lies on the straight line passing through the two points (2 , 3) , (4 , 4) is $\dots\dots\dots$
 (a) (1 , 1) (b) (4 , 2) (c) (6 , 5) (d) (3 , 6)
- 7 ABC is a right-angled triangle at B , if $3AC = 5BC$, then $\tan A = \dots\dots\dots$
 (a) $\frac{3}{5}$ (b) $\frac{5}{3}$ (c) $\frac{3}{4}$ (d) $\frac{1}{3}$
- 8 DHO is a right-angled triangle at O , if $\tan D = 1$, then $\dots\dots\dots$
 (a) $m(\angle D) = m(\angle O)$ (b) $DH = DO$
 (c) $m(\angle H) = m(\angle O)$ (d) $DO = OH$
- 9 The image of the point (- 2 , 1) by reflection in y-axis lies in the $\dots\dots\dots$ quadrant.
 (a) first (b) second (c) third (d) fourth

Second Group :

► Answer the following questions writhing the steps of solution :

- 10 Find the equation of the straight line which passes through the point (9 , 6) and is parallel to the straight line whose equation is $3y + X = 5$

11 Without using the calculator , find the value of H where $(H + 5)^\circ$ is the measure of an acute angle : $\tan (H + 5)^\circ = \sin 30^\circ \cos 60^\circ + \cos^2 30^\circ \tan 45^\circ$

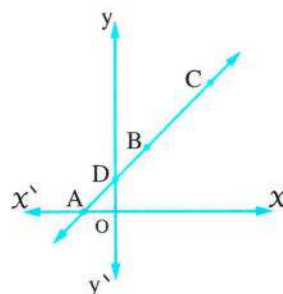
12 Find the value of a if the straight line whose equation is $(a - 4)X - 3y = 5$ is parallel to the straight line which passes through the two points $(0, 5)$, $(a, 9)$

13 In the opposite figure :

$B(1, 2)$, $C(3, 4)$

Find : (1) The equation of $\overleftrightarrow{AC}$

(2) The area of $\triangle OAD$



14 $\overline{AB}$ is a diameter in a circle whose centre is $(5, 7)$ and $B(8, 11)$
 , find the equation of the straight line which is perpendicular to $\overline{AB}$ from the point A

15 ABCD is a trapezoid where $\overline{AD} \parallel \overline{BC}$, $m(\angle B) = 90^\circ$, $AB = 3$ cm. , $BC = 10$ cm.
 , $AD = 6$ cm. **Find the value of :** $2 \cos (\angle DCB) - \tan (\angle ACB)$

16 If the distance between the two points $(X, 5)$, $(6, 1)$ equals $2\sqrt{5}$ length unit.
 , find the value of X



El-Monofia Governorate



Answer the following questions : *(Calculator is allowed)*

First Question :

[a] Choose the correct answer :

1 A square , if its perimeter is 20 cm. , then its surface area = cm^2

(a) 100

(b) 25

(c) 16

(d) 5

2 The number of axes of symmetry of the equilateral triangle equals

(a) 1

(b) 2

(c) 3

(d) 4

3 If $\tan 3X = 1$ where $(3X)$ is the measure of an acute angle) , then $X = \dots\dots\dots$

(a) 30

(b) 45

(c) 15

(d) 75

[b] If the point $C(4, y)$ is the midpoint of $\overline{AB}$, where $A(X, 3)$, $B(6, 5)$

, find the value of : $X + y$

Second Question :

[a] Choose the correct answer :

1 $2 \cos 60^\circ = \dots\dots\dots$

- (a) 2 (b) 1 (c) 3 (d) -1

2 ΔABC is a right-angled triangle at B , if $2 AB = \sqrt{3} AC$, then $m(\angle C) = \dots\dots\dots^\circ$

- (a) 30 (b) 45 (c) 60 (d) 75

3 $\cos 35^\circ = \sin \dots\dots\dots^\circ$

- (a) zero (b) 35 (c) 65 (d) 55

[b] Prove that the points A (2 , 1) , B (0 , - 3) , C (3 , 3) are collinear (lie on the same straight line).

Third Question :

[a] Choose the correct answer :

1 The distance between the point (- 4 , 2) and the y-axis equals $\dots\dots\dots$ length unit.

- (a) 4 (b) 2 (c) - 4 (d) 6

2 The equation of the straight line which passes through the point (3 , - 2) and is parallel to the X-axis is $\dots\dots\dots$

- (a) $X = 3$ (b) $y = - 2$ (c) $X = - 2$ (d) $y = 2$

3 If A (5 , 7) , B (1 , - 1) , then the midpoint of $\overline{AB}$ is $\dots\dots\dots$

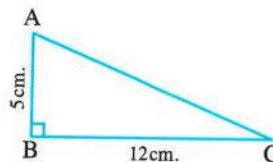
- (a) (2 , 3) (b) (3 , 3) (c) (3 , 2) (d) (3 , 4)

[b] In the opposite figure :

If ΔABC is a right-angled triangle at B ,

$AB = 5 \text{ cm.}$, $BC = 12 \text{ cm.}$

, find : (1) $\sin A \cos C + \cos A \sin C$ (2) $m(\angle C)$



Fourth Question :

[a] Find the value of k which makes the straight line whose equation is :

$3y + kX - 8 = 0$ parallel to the straight line which makes an angle of measure 45° with the positive direction of X-axis.

[b] Find the value of E which satisfies :

$2 \cos E = 4 \sin^2 60^\circ - 2 \tan 45^\circ$ (where E is the measure of an acute angle)

Fifth Question :

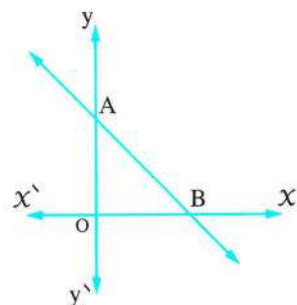
[a] Prove that $\triangle ABC$ whose vertices are $A(1, 4)$, $B(-1, 2)$, $C(2, -1)$ is a right-angled triangle at B , then find its surface area.

[b] In the opposite figure :

If $\overleftrightarrow{AB}$ cuts the X -axis and y -axis
at the two points B and A respectively
, $OB = 4$ length units , $OA = 4$ length units ,

find :

- (1) The slope of $\overleftrightarrow{AB}$
- (2) The equation of $\overleftrightarrow{AB}$



El-Gharbia Governorate



Answer the following questions : (Calculators are permitted)

First Group :

► Choose the correct answer from those given :

- 1 The distance between the point $(-2, -1)$ and the X -axis is length unit.
(a) -2 (b) -1 (c) 2 (d) 1
- 2 If the two vertically opposite angles are supplementary, then the measure of each of them equals $^{\circ}$
(a) 120 (b) 60 (c) 90 (d) 180
- 3 $\tan 45^{\circ} \sin^2 30^{\circ} = \dots\dots\dots$
(a) 1 (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) 2
- 4 If the two straight lines whose slopes are $-\frac{1}{4}$ and $4k$ are perpendicular, then $k = \dots\dots\dots$
(a) $\frac{1}{4}$ (b) zero (c) -1 (d) 1
- 5 The slope of the straight line whose equation is : $y - 2x = 3$ equals
(a) 2 (b) 3 (c) 1 (d) -1
- 6 If $\sin X = \frac{1}{2}$ where X is the measure of an acute angle, then $\cos 2X = \dots\dots\dots$
(a) $\frac{\sqrt{3}}{2}$ (b) $\frac{1}{2}$ (c) $\frac{1}{8}$ (d) $\frac{3}{2}$
- 7 If $X \cos 60^{\circ} = \tan 45^{\circ}$, then $X = \dots\dots\dots$
(a) 2 (b) 1 (c) $\sqrt{3}$ (d) $\frac{\sqrt{2}}{2}$

8 The distance between the two points $(3, 0)$, $(0, 4)$ equals length units.

- (a) 3 (b) 4 (c) 7 (d) 5

9 If $\tan(X + 20^\circ) = \sqrt{3}$ where X is the measure of an acute angle, then $X =$

- (a) 10 (b) 20 (c) 30 (d) 40

Second Group :

► Answer the following questions :

10 Find the equation of the straight line which passes through the point $A(-3, 4)$ and the midpoint of $\overline{BC}$ where $B(5, -1)$ and $C(3, 5)$.

11 If the triangle whose vertices are $Y(4, 2)$, $X(3, 5)$ and $Z(-5, a)$ is a right-angled at Y , then find the value of a

12 Find the value of X which satisfies :

$$2 \sin X = \tan^2 60^\circ - 2 \tan 45^\circ, \text{ where } X \text{ is the measure of an acute angle.}$$

13 Find the equation of the straight line which passes through the point $(3, 4)$ and its slope $= \frac{1}{2}$

14 Find the equation of the straight line which passes through the point $(4, 5)$ and makes with the positive direction of the X -axis an angle of measure 135°

15 ABC is a right-angled triangle at C , $AB = 13$ cm. and $BC = 12$ cm.

Find the value of : (1) $\sin B$ (2) $1 + \tan^2 A$

16 Find the equation of the straight line which passes through the point $(1, 2)$ and is parallel to the straight line whose equation is : $X + 2y = 5$

8

El-Dakahlia Governorate



Answer the following questions : (Calculator is permitted)

First Question :

[a] Choose the correct answer :

1 If the y -axis bisects $\overline{AB}$ where $A(3, 4)$, $B(X, 6)$, then $X =$

- (a) -6 (b) -4 (c) -3 (d) zero

2 If the area of a square is 50 cm^2 , then the length of its diagonal equals cm.

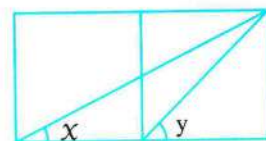
- (a) $5\sqrt{2}$ (b) 10 (c) $10\sqrt{2}$ (d) 5

3 In the opposite figure :

Two congruent squares

, then $\tan X + \tan y = \dots\dots\dots$

- (a) 1 (b) $\frac{5}{2}$ (c) 2 (d) $\frac{3}{2}$



[b] If $4 \sin X = \tan^2 60^\circ - 2 \sin 30^\circ$, without using calculator, find the value of X (where X is the measure of an acute angle).

Second Question :

[a] Choose the correct answer :

1 $2 \sin 30^\circ \cos 60^\circ = \dots\dots\dots$

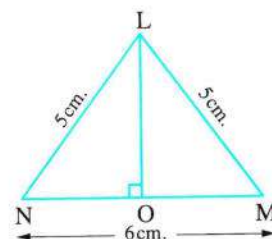
- (a) 2 (b) $\frac{1}{2}$ (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{\sqrt{3}}{5}$

2 In the opposite figure :

LMN is a triangle, $LM = LN = 5$ cm.

, $MN = 6$ cm. , $\overline{LO} \perp \overline{MN}$, then $\sin M = \dots\dots\dots$

- (a) $\frac{4}{5}$ (b) $\frac{3}{5}$
(c) $\frac{3}{4}$ (d) $\frac{4}{3}$



3 The distance between the point $(\sqrt{3}, 1)$ and the origin point is $\dots\dots\dots$ length unit.

- (a) 4 (b) 3 (c) 2 (d) 1

[b] ABCD is a parallelogram where A (3, 4), B (2, -1), C (-4, -3).

Find the coordinates of the point D

Third Question :

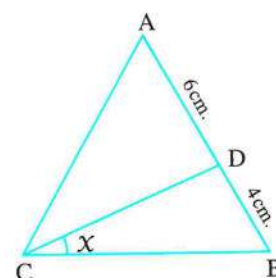
[a] In the opposite figure :

$\triangle ABC$ is an equilateral triangle

, $D \in \overline{AB}$ where $AD = 6$ cm.

, $DB = 4$ cm.

Find the value of : $1 + \tan^2 X$



[b] If the area of the triangle which is bounded by the straight lines $\frac{x}{a} + \frac{y}{b} = 1$, $x = 0$, $y = 0$ equals 12 square unit where $a > 0$, $b > 0$, find the value of ab

Fourth Question :

[a] If the straight line passing through the points $(3, 1)$, $(2, k)$ is perpendicular to the straight line whose equation is $y - x = 3$, find the value of k

[b] In the opposite figure :

ABCD is a square, $A(8, 9)$

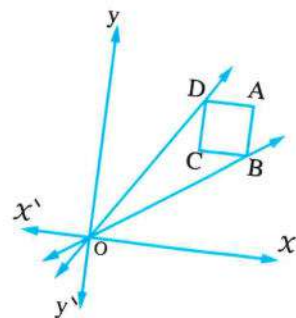
, $\overrightarrow{AD} \parallel \overrightarrow{xx'}$, $\overrightarrow{AB} \parallel \overrightarrow{yy'}$

, the equation of $\overrightarrow{OB}$ is $y = \frac{3}{4}x$

Find :

(1) The coordinates of the point D

(2) The equation of $\overrightarrow{OD}$



Fifth Question :

[a] Choose the correct answer :

1 If $\tan \theta = \frac{\sin 70^\circ}{\cos 20^\circ}$, then $\theta = \dots\dots\dots^\circ$

(a) 20

(b) 45

(c) 70

(d) 90

2 In the opposite figure :

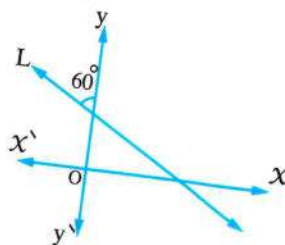
The slope of the straight line $L = \dots\dots\dots$

(a) $\frac{\sqrt{3}}{3}$

(b) $\sqrt{3}$

(c) $-\sqrt{3}$

(d) $-\frac{\sqrt{3}}{3}$



3 If the lengths of two sides in a triangle are 3 cm., 8 cm., then the greatest integer representing the length of the third side is $\dots\dots\dots$ cm.

(a) 5

(b) 8

(c) 10

(d) 11

[b] If $A(x, 3)$, $B(3, 2)$, $C(5, 1)$ and $AB = BC$, find the value of : x

9

Suez Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from those given :

1 If $\sin 30^\circ = \cos x$, where x is the measure of an acute angle, then $x = \dots\dots\dots$

(a) 15°

(b) 30°

(c) 60°

(d) 90°

- 2 ABCD is a parallelogram, $m(\angle A) = 80^\circ$, then $m(\angle B) = \dots\dots\dots$
 (a) 40° (b) 100° (c) 80° (d) 160°
- 3 If $X \tan 45^\circ = 2$, then $X = \dots\dots\dots$
 (a) 2 (b) $\frac{1}{2}$ (c) 1 (d) 4
- 4 The distance between the point A (3, 4) and the origin point O (0, 0) is $\dots\dots\dots$ length unit.
 (a) 5 (b) 7 (c) 12 (d) 1
- 5 If ΔABC is an isosceles triangle in which $AB = 3$ cm., $BC = 7$ cm., then $AC = \dots\dots\dots$ cm.
 (a) 3 (b) 4 (c) 7 (d) 10
- 6 If $\cos X = \frac{\sqrt{3}}{2}$, where X is the measure of an acute angle, then $X = \dots\dots\dots$
 (a) 30° (b) 45° (c) 60° (d) 90°
- 7 $(47 \frac{1}{2})^\circ = \dots\dots\dots$ in degrees and minutes.
 (a) $47^\circ 50'$ (b) $47^\circ 5'$ (c) $47^\circ 30'$ (d) $47^\circ 20'$
- 8 ABCD is a square, its diagonals intersect at M where A (3, 4), C (5, 6), then the point M is $\dots\dots\dots$
 (a) (8, 10) (b) (4, 5) (c) (10, 8) (d) (15, 24)
- 9 If $\overrightarrow{AB} \perp \overrightarrow{CD}$, and the slope of $\overrightarrow{AB} = \frac{1}{2}$, then the slope of $\overrightarrow{CD} = \dots\dots\dots$
 (a) $\frac{1}{2}$ (b) 2 (c) $-\frac{1}{2}$ (d) -2

Second Group :

► Answer the following questions :

- 10 If $2 \sin X = \tan^2 60^\circ - 2 \tan 45^\circ$, find the value of : X
 (Where X is the measure of an acute angle)
- 11 Determine the type of ΔABC where A (-2, 4), B (3, -1), C (4, 5) with respect to its sides.
- 12 Find the equation of the straight line whose slope = 3 and passes through the point (1, 5)
- 13 XYZ is a triangle in which $\angle Y$ is right, $XY = 3$ cm., $XZ = 5$ cm.
 Find the value of : $\tan X + \tan Z$
- 14 Find the slope and the length of the intercepted part from the y-axis of the straight line whose equation is $3y - 2x = 6$
- 15 If C = (5, 3) is the midpoint of $\overline{AB}$, where A (4, -1), find the coordinates of the point B
- 16 Prove that the straight line passing through the two points (0, 3), (1, 4) is parallel to the straight line which makes with the positive direction of the X-axis an angle of measure 45°

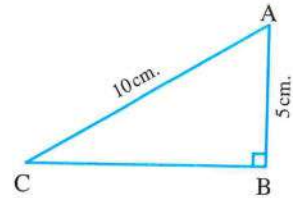


Answer the following questions :

First Group :

► Choose the correct answer from those given :

- 1 $\sin 30^\circ = \cos \dots\dots\dots^\circ$
 (a) 30 (b) 45 (c) 60 (d) 90
- 2 The equation of the straight line which passes through the point (2 , 3) and is parallel to the y-axis is
 (a) $x = 2$ (b) $x = 3$ (c) $y = 2$ (d) $y = 3$
- 3 The area of the square whose side length equals 5 cm. is cm^2
 (a) 50 (b) 25 (c) 20 (d) 10
- 4 $\sin 30^\circ + \cos 60^\circ - \tan^2 45^\circ = \dots\dots\dots$
 (a) 2 (b) 1 (c) zero (d) - 1
- 5 The sum of measures of the accumulative angles around one point equals $^\circ$
 (a) 90 (b) 180 (c) 270 (d) 360
- 6 If $-\frac{2}{3}$, $\frac{k}{6}$ are two slopes of two parallel lines , then $k = \dots\dots\dots$
 (a) 9 (b) - 4 (c) 4 (d) - 9
- 7 In the opposite figure :
 $m(\angle A) = \dots\dots\dots^\circ$
 (a) 30 (b) 45
 (c) 60 (d) 70
- 8 The distance between the point (3 , 5) and the X-axis equals length unit.
 (a) 3 (b) 5 (c) 2 (d) 8
- 9 If $\tan (X + 20)^\circ = 1$, where X is the measure of an acute angle , then $X = \dots\dots\dots^\circ$
 (a) 20 (b) 25 (c) 40 (d) 70



Second Group :

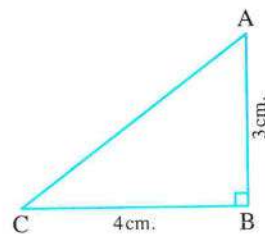
► Answer the following questions :

- 10 Find the value of X which satisfies that : $\cos X = \tan^2 45^\circ - \sin^2 45^\circ$
 where X is the measure of an acute angle.

- 11 Prove that the points A (4 , 4) , B (7 , 0) , C (1 , 0) are the vertices of an isosceles triangle.
- 12 Find the equation of the straight line that passes through the point (0 , 3) and is parallel to the line that passes through the two points (3 , 6) , (1 , 2)

13 Using the opposite figure , find the value of :

$$\sin A \sin C - \cos A \cos C$$



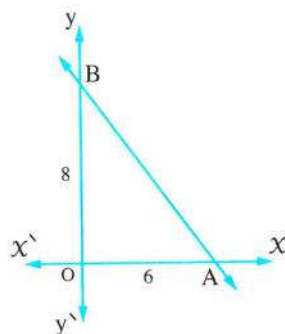
- 14 Prove that the straight line whose equation is $X + y = 4$ is perpendicular to the straight line that makes with the positive direction of the X -axis a positive angle of measure 45°
- 15 If the point C (3 , 2) is the midpoint of $\overline{AB}$ where A (1 , y) , B (X , 3) , find : (X , y)

16 In the opposite figure :

OB = 8 length units

, OA = 6 length units.

Find : the equation of $\overleftrightarrow{AB}$



Kafr El-Sheikh Governorate



Answer the following questions : (Calculator is permitted)

First Group :

► Choose the correct answer from those given :

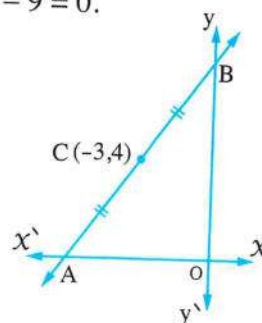
- 1 The image of the point (3 , -2) by reflection across the origin point is
 (a) (-3 , 2) (b) (-3 , -2) (c) (3 , 2) (d) (2 , 3)
- 2 If $\tan (X + 10^\circ) = \sqrt{3}$ where X is the measure of an acute angle , then $X = \dots\dots\dots^\circ$
 (a) 50 (b) 40 (c) 70 (d) 45
- 3 The circle whose centre is (7 , 4) and passing through (3 , 1) , the length of its diameter is length units.
 (a) 7 (b) 10 (c) 5 (d) 4
- 4 ABCD is a parallelogram in which $m(\angle A) + m(\angle C) = 200^\circ$, then $m(\angle B) = \dots\dots\dots^\circ$
 (a) 50 (b) 80 (c) 100 (d) 160

- 5 If the two straight lines $X + y = 4$ and $aX + 3y = 0$ are perpendicular, then $a = \dots\dots\dots$
- (a) -3 (b) -1 (c) 1 (d) 3
- 6 ABC is a right-angled triangle at C, where $m(\angle A) = m(\angle B)$, then the ratio among the lengths of the triangle sides is $\dots\dots\dots$
- (a) $1 : 1 : \sqrt{2}$ (b) $\sqrt{3} : 2 : 1$ (c) $1 : 2 : \sqrt{5}$ (d) $3 : 4 : 5$
- 7 If $\sin 2X = \frac{\sqrt{3}}{2}$, where X is the measure of an acute angle, then $\cos X = \dots\dots\dots$
- (a) $\frac{\sqrt{3}}{2}$ (b) $\frac{1}{2}$ (c) 1 (d) $\frac{1}{\sqrt{2}}$
- 8 The straight line whose equation is $4X + 5y - 20 = 0$, the length of the intercepted part of the X -axis is $\dots\dots\dots$ length units.
- (a) -4 (b) -5 (c) 4 (d) 5
- 9 ABC is a right-angled triangle at B, where $AC = 15$ cm., $AB = 12$ cm., then $\cos A \cos C = \dots\dots\dots$
- (a) $\cos B$ (b) $\cos A \sin C$ (c) $\sin A \sin C$ (d) $\sin A \cos C$

Second Group :

► Answer the following questions :

- 10 State the kind of the triangle ABC whose vertices are $A(1, 1)$, $B(0, 4)$, $C(-1, 1)$ with respect to its sides.
- 11 If $\sin X \sin^2 60^\circ = 3 \sin^2 45^\circ \cos^2 45^\circ \cos 60^\circ$, find : $m(\angle X)$ by steps where X is an acute angle.
- 12 ABCD is a rhombus where $A(3, 2)$, $B(4, -3)$ and $C(-1, -2)$, find the equation of $\overrightarrow{BD}$
- 13 Find the equation of the straight line which cuts a part of length 5 units from the negative part of the y -axis and is parallel to the line whose equation is $X - 3y - 9 = 0$.
- 14 In the opposite figure :
The point $C(-3, 4)$ is the midpoint of $\overline{AB}$
Find the coordinates of the points A and B
- 15 If the straight line L_1 passes through the two points $(3, 1)$, $(2, k)$ and the straight line L_2 makes with the positive direction of the X -axis an angle of measure 45° , then find the value of k if the two straight lines are parallel.



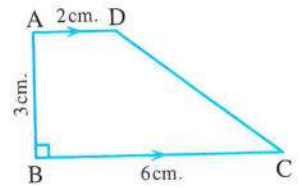
16 In the opposite figure :

ABCD is a trapezium , $m(\angle B) = 90^\circ$, $\overline{AD} \parallel \overline{BC}$
, $AB = 3 \text{ cm.}$, $BC = 6 \text{ cm.}$, $AD = 2 \text{ cm.}$

Find by steps :

(1) The length of $\overline{DC}$

(2) $m(\angle BCD)$



12

El-Beheira Governorate



Answer the following questions :

First Group :

► **Choose the correct answer :**

1 If A (5 , 7) , B (1 , - 1) , then the slope of $\overleftrightarrow{AB} = \dots\dots\dots$

(a) $\frac{1}{2}$

(b) 2

(c) $-\frac{1}{2}$

(d) - 2

2 The straight line whose equation is : $3x - 2y + 6 = 0$ intersects from the X-axis a part of length length units.

(a) 2

(b) - 2

(c) 3

(d) - 3

3 In $\triangle ABC$, if $m(\angle A) = 85^\circ$ and $\sin B = \cos 2B$, then $m(\angle C) = \dots\dots\dots^\circ$

(a) 30

(b) 45

(c) 60

(d) 65

4 In the triangle ABC , $AB = AC$, $m(\angle C) = 55^\circ$, then $m(\angle A) = \dots\dots\dots^\circ$

(a) 55

(b) 110

(c) 70

(d) 75

5 **In the opposite figure :**

$\overline{BA} \parallel \overline{CD}$, $\overline{BC} \parallel \overline{DE}$

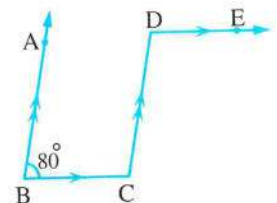
, $m(\angle B) = 80^\circ$, $m(\angle EDC) = \dots\dots\dots^\circ$

(a) 80

(b) 100

(c) 120

(d) 90



6 If $\tan(X + 10^\circ) = 1$, where X is the measure of an acute angle , then $X = \dots\dots\dots^\circ$

(a) 45

(b) 55

(c) 60

(d) 35

7 If the points A (0 , 1) , B (X , 3) , C (2 , 5) are collinear , then $X = \dots\dots\dots$

(a) 1

(b) 2

(c) - 1

(d) 3

8 If $X \sin^2 45^\circ = \tan^2 60^\circ$, then $X = \dots\dots\dots$

(a) 3

(b) 4

(c) 6

(d) 8

9 The triangle ABC is a right-angled at B and $3AB = 4BC$, then $\tan(\angle C) = \dots\dots\dots$

(a) $\frac{4}{3}$

(b) $\frac{4}{5}$

(c) $\frac{3}{4}$

(d) $\frac{3}{5}$

Second Group :

► Answer the following questions :

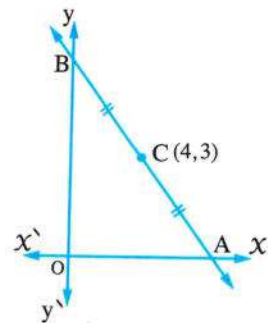
- 10 If the distance of the point $(X, 5)$ from the point $(6, 1)$ equals $2\sqrt{5}$ length units, then find the value of X

11 In the opposite figure :

$A \in X\text{-axis}$, $B \in y\text{-axis}$ and

$C(4, 3)$ is the midpoint of $\overline{AB}$

Find : the length of $\overline{AB}$



- 12 Prove that the straight line passing through the two points $(-1, 3)$, $(2, 4)$ is parallel to the straight line whose equation is : $3y - x - 1 = 0$
- 13 Find the equation of the straight line passing through the two points $A(2, -3)$ and $B(1, -1)$
- 14 Find the equation of the straight line which passes through the point $(0, 5)$ and is perpendicular to the straight line : $x + 2y - 7 = 0$
- 15 Find the value of X which satisfies :
 $\sin X \sin 30^\circ \tan 60^\circ = \tan 45^\circ - \cos^2 60^\circ$, where X is the measure of an acute angle.
- 16 XYZ is a right-angled triangle at Y , where $XY = 5$ cm. , $XZ = 13$ cm.
Find : (1) The value of : $\tan X + \tan Z$
(2) $m(\angle Z)$ to the nearest minute.

13

El-Fayoum Governorate



Answer the following questions : (Calculator is allowed)

First Question :

► Choose the correct answer from the given ones :

- 1 If m_1 and m_2 are the slopes of two parallel straight lines , then
- (a) $m_1 - m_2 = 0$ (b) $m_1 + m_2 = 0$ (c) $m_1 m_2 = 0$ (d) $m_1 m_2 = -1$

- 2 The point of concurrence of the medians of the triangle divides each median by the ratio of : 5 from the vertex.
 (a) 5 (b) 2 (c) 1 (d) 10
- 3 If the measure of one of the interior angles of a regular polygon is 135° , then the number of its sides
 (a) 6 (b) 7 (c) 8 (d) 9
- 4 The perpendicular distance between $X = 5$, $X + 3 = 0$ equals length unit.
 (a) 2 (b) 8 (c) -8 (d) 4
- 5 ABC is a right-angled triangle at B, then $\sin A - \cos C =$
 (a) $2 \sin A$ (b) $2 \cos C$ (c) zero (d) 1
- 6 In ΔABC , if $m(\angle A) = 60^\circ$, $\sin C = \cos C$, then $m(\angle B) =$
 (a) 30° (b) 45° (c) 60° (d) 75°

Second Question :

[a] Choose the correct answer from the given ones :

- 1 The distance between the point $(5, \tan^2 60^\circ)$ and the X -axis is length unit.
 (a) 5 (b) $5\sqrt{3}$ (c) 3 (d) $3\sqrt{3}$
- 2 If ABCD is a rectangle, $A(-4, -1)$, $C(4, 5)$, then the length of $\overline{BD} =$ length unit.
 (a) 4 (b) 5 (c) 6 (d) 10
- 3 If $\sin 70^\circ = \cos(2X)^\circ$, where $2X$ is the measure of an acute angle, then $X =$
 (a) 10° (b) 20° (c) 45° (d) 60°
- [b] If $\tan\left(\frac{3X}{2}\right)^\circ = 1$, where X is the measure of an acute angle
 , find the value of : $\sin^2 X + \cos^2 X$

Third Question :

- [a] If the distance between the two points $A(2, X)$ and $B(3, -1)$ is $\sqrt{17}$ length unit
 , then find the value of : X
- [b] If C is the midpoint of $\overline{AB}$, then find the values of X and y where $A(-3, y)$, $B(9, 11)$
 and $C(X, -3)$

Fourth Question :

- [a] Prove that the straight line passing through the two points $A(-3, 4)$ and $C(-3, -2)$ is perpendicular to the straight line passing through the two points $B(1, 2)$ and $D(-3, 2)$

- [b] Find the equation of the straight line which passes through the two points $(4, 2)$ and $(-2, -1)$, then prove that it passes through the origin point.

Fifth Question :

- [a] Find the equation of the straight line which passes through the point $(0, -2)$ and is parallel to the straight line $x - 2y = 7$
- [b] Prove that the points A $(0, 1)$, B $(4, 5)$, C $(1, 8)$, D $(-3, 4)$ are the vertices of a rectangle, then find the length of its diagonal.

14

El-Menia Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from those given :

- 1 The number of diagonals of the hexagon is
 (a) 6 (b) 3 (c) 12 (d) 9
- 2 The tangent of an acute angle of the right-isosceles triangle is equal to
 (a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$ (c) 1 (d) $\frac{\sqrt{2}}{2}$
- 3 The slope of the straight line that makes with the positive direction of the x -axis an angle of measure θ equals
 (a) $\sin \theta$ (b) $\cos \theta$ (c) $\tan \theta$ (d) $\sin \theta + \cos \theta$
- 4 The two straight lines : $y = ax + b$ and $y = cx + d$ are perpendicular, then = -1
 (a) $a \times d$ (b) $b \times c$ (c) $a \times c$ (d) $b \times d$
- 5 If ABCD is a square, then $m(\angle CAB) =$
 (a) 90° (b) 45° (c) 60° (d) 30°
- 6 If x, y are the measures of two complementary angles, then $\sin x =$
 (a) $\sin y$ (b) $\cos y$ (c) $\tan x$ (d) $\tan y$
- 7 If $2 \sin x = \tan 60^\circ$, where x is the measure of an acute angle, then the value of $x =$
 (a) 30° (b) 45° (c) 60° (d) 40°
- 8 If C is the midpoint of $\overline{AB}$, where A $(5, -3)$, B $(7, -5)$, then the point C =
 (a) $(6, 4)$ (b) $(6, -4)$ (c) $(-6, 4)$ (d) $(-4, 6)$

- 9 ABC is a right-angled triangle at B , where $3 AC = 5 BC$, then $\sin A = \dots\dots\dots$
- (a) $\frac{3}{5}$ (b) $\frac{5}{3}$ (c) $\frac{3}{4}$ (d) $\frac{4}{3}$

Second Group :

► Answer the following questions :

- 10 Without using the calculator , prove that : $5 \sin^2 30^\circ = 9 \cos^2 60^\circ - \tan^2 45^\circ$
- 11 Prove that the triangle whose vertices are A (1 , 4) , B (− 1 , − 2) and C (2 , − 3) is a right-angled.
- 12 Find the equation of the straight line passing through the point (3 , − 5) and parallel to the straight line : $X + 2 y - 7 = 0$
- 13 ΔABC is a right-angled at B , $AC = 13$ cm. , $BC = 12$ cm.
Find the length of $\overline{AB}$ and find the value of $(1 + \tan^2 C)$
- 14 If the straight line which passes through the two points (− 1 , 7) and (9 , 3) is perpendicular to the straight line whose equation is $X + k y - 13 = 0$, find the value of : k
- 15 Find the equation of the straight line passing through the point (3 , 2) and makes with the positive direction of the X-axis an angle of measure 45°
- 16 Prove that the points A (3 , − 1) , B (− 4 , 6) and C (2 , − 2) are located on a circle whose centre is M (− 1 , 2) , then find the circumference of the circle (where $\pi = 3.14$)



Assiut Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer from those given :

- 1 If $\sin X = \cos X$, then $\tan X = \dots\dots\dots$ (where X is an acute angle)
- (a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$ (c) 1 (d) $\frac{1}{\sqrt{2}}$
- 2 If 5 , 7 , k are the lengths of sides of a triangle , then k may be equals to
- (a) 2 (b) 7 (c) 12 (d) 14
- 3 If $\tan (X + 30^\circ) = \sqrt{3}$, then $X = \dots\dots\dots^\circ$ (where X is the measure of an acute angle)
- (a) 30 (b) 60 (c) 80 (d) 90

4 In the opposite figure :

$$AB = BC = AC$$

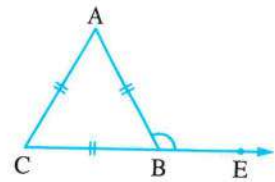
, then $m(\angle ABE) = \dots\dots\dots^\circ$

(a) 60

(b) 120

(c) 150

(d) 180



5 In the opposite figure :

$m(\angle BAC) = 90^\circ$, $AB = 3$ cm.

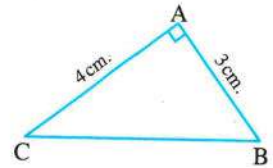
, $AC = 4$ cm. , then $\sin B = \dots\dots\dots$

(a) $\frac{4}{3}$

(b) $\frac{3}{4}$

(c) $\frac{4}{5}$

(d) $\frac{3}{5}$



6 If $X \sin 30^\circ = \tan^2 60^\circ - 2 \tan 45^\circ$, then $X = \dots\dots\dots$

(a) 2

(b) 3

(c) $\frac{1}{2}$

(d) 1

7 The equation of the straight line which passes through the point $(3, -8)$ and is parallel to the X -axis is $\dots\dots\dots$

(a) $X = 3$

(b) $y = -8$

(c) $y = 3$

(d) $X = -8$

8 The points $(0, 0)$, $(3, 0)$, $(0, 4)$ $\dots\dots\dots$

(a) form an obtuse-angled triangle.

(b) form an acute-angled triangle.

(c) form a right-angled triangle.

(d) are collinear.

9 A circle of centre at the origin point and its radius is 2 length units , which of the following points belongs to the circle ?

(a) $(1, -2)$

(b) $(-2, \sqrt{5})$

(c) $(\sqrt{3}, 1)$

(d) $(0, 1)$

Second Group :

► Answer the following questions :

10 If the ratio among the measures of the angles of a triangle is as the ratio $3 : 7 : 8$, find the degree measure for each of its angles.

11 A ladder $\overline{AB}$ is of length 6 metres, its upper edge A lies on a vertical wall and its other edge B on a horizontal floor. If C is the projection of the point A on the surface of the floor and the measure of its angle with the surface of the floor was 60° , then find the length of $\overline{AC}$

12 Find the equation of the straight line passing through the point $(3, 4)$ and perpendicular to the straight line $5X - 2Y + 7 = 0$

- 13 If the points A (3 , 2) , B (4 , -3) , C (-1 , -2) , D (-2 , 3) are the vertices of a rhombus , find :
- (1) The two coordinates of the point of intersection of the two diagonals.
 - (2) The area of the rhombus ABCD
- 14 Find the area of the triangle in square unit , identified by the straight lines :
 $3x + 4y = 12$, $x = 0$, $y = 0$
- 15 If $\overleftrightarrow{AB} \parallel y\text{-axis}$ where A (x , 7) , B (3 , 5) , find the value of : x
- 16 Find the equation of the straight line whose slope is 2 and passes through the point (0 , 1)

16

Souhag Governorate



Answer the following questions : (Calculator is allowed)

First Group :

► Choose the correct answer :

- 1 If $\tan (X + 20^\circ) = \sqrt{3}$, where X is the measure of an acute angle , then X =
- (a) 20° (b) 30° (c) 40° (d) 50°
- 2 $\sin 30^\circ + \cos 60^\circ = \dots\dots\dots$
- (a) $\frac{1}{4}$ (b) zero (c) 1 (d) $\frac{\sqrt{3}}{2}$
- 3 The equation of the straight line passing through the point (5 , -4) and perpendicular to the y-axis is
- (a) $y = -4$ (b) $x = 5$ (c) $y = 4$ (d) $x = -5$
- 4 If $\cos \frac{X}{2} = \frac{\sqrt{3}}{2}$, where X is the measure of an acute angle , then $\sin X = \dots\dots\dots$
- (a) $\frac{1}{2}$ (b) $\frac{1}{\sqrt{3}}$ (c) $\frac{2}{\sqrt{3}}$ (d) $\frac{\sqrt{3}}{2}$
- 5 The distance between the point (-3 , 4) and the origin point is length unit.
- (a) 7 (b) 5 (c) 10 (d) 12
- 6 The number of medians of the isosceles triangle is
- (a) 1 (b) zero (c) 3 (d) 2
- 7 The straight line whose equation is : $cx + ay + b = 0$, its slope is
- (a) $-\frac{a}{b}$ (b) $-\frac{a}{c}$ (c) $-\frac{b}{c}$ (d) $-\frac{c}{a}$
- 8 For any acute angle of measure A , the expression : $\sin A - \cos A \tan A = \dots\dots\dots$
- (a) -1 (b) zero (c) 1 (d) 2

- 9 The sum of measures of the exterior angles of the equilateral triangle is
- (a) 120° (b) 60° (c) 360° (d) 180°

Second Group :

► Answer the following questions :

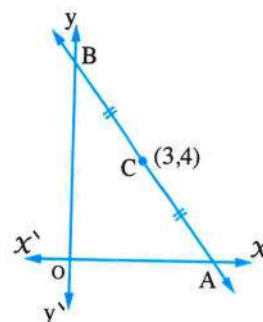
- 10 If the straight line L_1 passes through the two points $(3, 1)$, $(2, k)$ and the straight line L_2 makes with the positive direction of the X -axis an angle of measure 45° , find k if the two straight lines L_1 and L_2 are parallel.
- 11 Find the equation of the straight line that is perpendicular to $\overline{AB}$ from its midpoint where $A(1, 3)$, $B(3, 5)$
- 12 Find the slope and the length of the intercepted part of the y -axis of the straight line whose equation is : $3y = 2x - 6$
- 13 If $2 \cos X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$, find X , where X is the measure of an acute angle.

14 In the opposite figure :

C is the midpoint of $\overline{AB}$
where $C(3, 4)$

Find :

- (1) The coordinates of A and B
- (2) The area of $\triangle AOB$

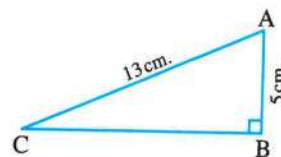


15 In the opposite figure :

$\triangle ABC$ is right-angled at B
, $AB = 5 \text{ cm.}$, $AC = 13 \text{ cm.}$

Find :

- (1) $\cos A \cos C - \sin A \sin C$
- (2) $m(\angle A)$



- 16 Show the type of the triangle whose vertices are $A(-2, 4)$, $B(3, -1)$, $C(4, 5)$ according to its sides.



Answer the following questions : (*Calculator is allowed*)

First Group :

► **Choose the correct answer from those given :**

- 1 If $\sin 65^\circ = \cos \theta$ where θ is an acute angle , then $m(\angle \theta) = \dots\dots\dots^\circ$
 (a) 65 (b) 35 (c) 25 (d) 15
- 2 The slope of the straight line whose equation is : $2x - 3y = 7$ is $\dots\dots\dots$
 (a) $\frac{3}{2}$ (b) $\frac{2}{3}$ (c) $-\frac{2}{3}$ (d) $-\frac{3}{2}$
- 3 ABC is a right-angled triangle at B. If $AB = 3$ cm. , $BC = 4$ cm. , then $AC = \dots\dots\dots$ cm.
 (a) 7 (b) 5 (c) 1 (d) 12
- 4 If A (3 , 4) , B (5 , 6) , then the midpoint of $\overline{AB}$ is $\dots\dots\dots$
 (a) (8 , 10) (b) (10 , 8) (c) (4 , 5) (d) (5 , 4)
- 5 If A (1 , 4) , B (3 , 6) , then the slope of $\overrightarrow{AB}$ is $\dots\dots\dots$
 (a) 1 (b) 2 (c) 3 (d) 4
- 6 XYZ is a triangle where $m(\angle Y) = 90^\circ$, $XY = 5$ cm. , $YZ = 12$ cm. , then $\sin X = \dots\dots\dots$
 (a) $\frac{5}{12}$ (b) $\frac{5}{13}$ (c) $\frac{12}{13}$ (d) $\frac{12}{5}$
- 7 If $\tan (X + 10^\circ) = 1$ where $(X + 10^\circ)$ is the measure of an acute angle , then $X = \dots\dots\dots^\circ$
 (a) 30 (b) 35 (c) 45 (d) 60
- 8 The distance between the point (3 , -5) and the X-axis equals $\dots\dots\dots$ length unit.
 (a) 3 (b) 5 (c) -3 (d) -5
- 9 If $\cos X = \frac{1}{2}$, where X is an acute angle , then $m(\angle X) = \dots\dots\dots^\circ$
 (a) 30 (b) 60 (c) 45 (d) 90

Second Group :

► **Answer the following questions :**

- 10 ΔABC is a right-angled triangle at B , $m(\angle A) = 2 m(\angle C)$
Find the value of : $\cos A + \sin C$
- 11 Find the equation of the straight line which passes through the point (2 , 3) and is parallel to the straight line whose equation is : $x + y + 2 = 0$

- 12 $\overline{AB}$ is a diameter of the circle M, if A (1, 4), M (3, -4), find the coordinates of the point B
- 13 Without using the calculator, find the numerical value of :
 $\sin 45^\circ \cos 45^\circ - \sin 30^\circ \cos 60^\circ$
- 14 Prove that the points A (1, 1), B (4, 3) and C (-5, -3) are collinear.
- 15 Find the slope and the length of the intercepted part from the y-axis of the straight line whose equation is : $y = 3x - 2$
- 16 Prove that the straight line which passes through the two points (-3, 2), (-2, 1) is perpendicular to the straight line which makes an angle of measure 45° with the positive direction of the X-axis.

18

South Sinai Governorate



Answer the following questions :

First Question :

► Choose the correct answer from the given ones :

- 1 If M (3, 0), N (0, 4), then the length of $\overline{MN}$ = length unit.
 (a) 7 (b) 6 (c) 5 (d) 4
- 2 A square its area is 36 cm^2 , then its perimeter is cm.
 (a) 16 (b) 24 (c) 4 (d) 6
- 3 If X and y are the measures of two complementary angles and $\sin X = \frac{3}{5}$, then $\cos Y =$
 (a) $\frac{4}{5}$ (b) $\frac{3}{5}$ (c) $\frac{3}{4}$ (d) $\frac{5}{3}$
- 4 If X is an acute angle and $2 \sin X - 1 = 0$, then $m(\angle X) =$ °
 (a) 90 (b) 60 (c) 45 (d) 30
- 5 The perpendicular distance from the point (-5, -2) to the y-axis is length unit.
 (a) -5 (b) -2 (c) 2 (d) 5
- 6 If $\sin X = \cos Y$, then $m(\angle X) + m(\angle Y) =$ °
 (a) 30 (b) 60 (c) 90 (d) 180

Second Question :

[a] Choose the correct answer from the given ones :

- 1 If L = (4, 5) and M = (2, 3), then the midpoint of $\overline{LM}$ is
 (a) (4, 2) (b) (3, 4) (c) (5, 2) (d) (2, 2)

2 The number of axes of symmetry of a square is

- (a) 1 (b) 2 (c) 3 (d) 4

3 $\sin 45^\circ \cos 45^\circ = \dots\dots\dots$

- (a) $\frac{1}{2}$ (b) 1 (c) $\frac{1}{\sqrt{2}}$ (d) zero

[b] If the point $(0, a)$ lies on the straight line whose equation is : $3x + 4y = 12$, then find the value of a

Third Question :

[a] Prove that the points $A(-2, 4)$, $B(3, -1)$, $C(-4, 6)$ are collinear.

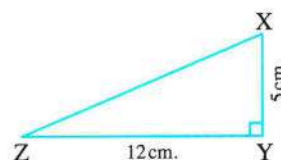
[b] In the opposite figure :

XYZ is a right-angled triangle at Y where :

$YZ = 12$ cm. , $XY = 5$ cm.

Find the value of :

$\cos X \cos Z + \sin X \sin Z$



Fourth Question :

[a] Find the value of X if : $2 \sin X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$
where X is the measure of an acute angle.

[b] If the point $(4, 6)$ is the midpoint of $\overline{LM}$ where $L = (X, 7)$, $M = (5, y)$, then find the values of X and y

Fifth Question :

[a] Find the equation of the straight line that its slope is $\frac{3}{2}$ and passing through the point $(-4, 5)$

[b] Find the equation of the straight line passing through the two points $(1, 3)$ and $(0, 5)$



Red Sea Governorate



Answer the following questions :

First Group :

► Choose the correct answer from the given ones :

1 The number of axes of symmetry of an isosceles triangle equals

- (a) zero (b) 1 (c) 2 (d) 3

- 2 If $\cos X = \frac{\sqrt{3}}{2}$, then $\cos 2X = \dots\dots\dots$ (where X is the measure of an acute angle)
 (a) $\sqrt{3}$ (b) $\frac{\sqrt{3}}{2}$ (c) 2 (d) $\frac{1}{2}$
- 3 The slope of the straight line whose equation is : $y = 2X + 3$ is $\dots\dots\dots$
 (a) 3 (b) $\frac{3}{2}$ (c) 2 (d) $\frac{2}{3}$
- 4 The distance between the point (3, 4) and the origin point equals $\dots\dots\dots$ length unit.
 (a) 5 (b) 4 (c) 3 (d) 1
- 5 If L_1, L_2 are two parallel straight lines, and the slope of $L_1 = \frac{2}{3}$, then the slope of $L_2 = \dots\dots\dots$
 (a) $-\frac{2}{3}$ (b) $\frac{2}{3}$ (c) $\frac{3}{2}$ (d) $-\frac{3}{2}$
- 6 The area of the square whose side length is 5 cm. equals $\dots\dots\dots$ cm.²
 (a) 5 (b) 10 (c) 20 (d) 25
- 7 In $\triangle XYZ$, $m(\angle Y) = 90^\circ$, $YX = YZ$, then $\tan X = \dots\dots\dots$
 (a) $\frac{1}{2}$ (b) 1 (c) $\sqrt{3}$ (d) $\frac{\sqrt{3}}{2}$
- 8 If $\sin X = \cos X$ where X is the measure of an acute angle, then $X = \dots\dots\dots^\circ$
 (a) 30 (b) 60 (c) 45 (d) 90
- 9 $\triangle ABC$ is a right-angled triangle at B, $AC = 5$ cm., $BC = 3$ cm., then $5 \tan C \cos C = \dots\dots\dots$
 (a) $\frac{16}{3}$ (b) $\frac{9}{4}$ (c) $\frac{4}{5}$ (d) 4

Second Group :

► Answer the following questions :

- 10 Prove that the triangle whose vertices are A (1, 1), B (3, 1) and C (1, 3) is an isosceles triangle.
- 11 Without using calculator, prove that : $\sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$
- 12 Find the equation of the straight line which passes through the points (2, -1), (1, 1)
- 13 Find the value of X if : $3 \sin X = \tan 60^\circ \cos 30^\circ$ (where X is the measure of an acute angle).
- 14 If C ($X, -3$) is the midpoint of $\overline{AB}$ where A (-3, y) and B (9, 0), find the values of X and y
- 15 Prove that the straight line whose equation is $y + X + 1 = 0$ is perpendicular to the straight line that makes an angle of measure 45° with the positive direction of the X -axis.

- 16 Find the equation of the straight line whose slope is 4 , and intercepts a positive part from the y-axis that equals 3 units and find its point of intersection with the X-axis.

20

Matrouh Governorate



Answer the following questions : (*Calculator is allowed*)

First Group :

► Choose the correct answer from those given :

- 1 The sum of measures of the interior angles of the parallelogram is
(a) 90° (b) 180° (c) 270° (d) 360°
- 2 If $\sin 30^\circ = \cos b$ where b is the measure of an acute angle , then b =
(a) 15° (b) 30° (c) 45° (d) 60°
- 3 If the two straight lines which have the slopes $-\frac{3}{2}$, $\frac{6}{k}$ are parallel , then k =
(a) -4 (b) $\frac{3}{2}$ (c) 2 (d) 9
- 4 If $\overline{AB}$ is a diameter of circle M and A (- 1 , 4) , B (- 3 , - 2) , then the centre of the circle M is
(a) (- 4 , - 6) (b) (- 2 , 1) (c) (- 2 , - 3) (d) (2 , 3)
- 5 If $\sin X + \cos 60^\circ = 1$, X is the measure of an acute angle , then X =
(a) 30° (b) 45° (c) 60° (d) 90°
- 6 The equation of the straight line passing through the point (2 , 3) and parallel to the y-axis is
(a) $X = 2$ (b) $X = 3$ (c) $y = 2$ (d) $y = 3$
- 7 $2 \cos X \tan X + \sin X = \dots\dots\dots$
(a) $2 \sin X$ (b) $3 \sin X$ (c) $2 \cos X$ (d) $3 \cos X$
- 8 Two complementary angles , the measure of one is 55° , then the measure of the other is
(a) 45° (b) 35° (c) 25° (d) 15°
- 9 If $\cos (X + 15^\circ) = \frac{1}{2}$, where X is the measure of an acute angle , then $\tan X = \dots\dots\dots$
(a) 1 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) -1

Second Group :

► Answer the following questions :

- 10 Find the equation of the straight line that passes through the point (1 , 5) and has the slope 2
- 11 Prove that the straight line which passes through the two points (3 , 2) , (6 , 5) is perpendicular to the straight line whose equation is : $2y + 2x + 5 = 0$
- 12 If C (3 , 4) is the midpoint of $\overline{AB}$, since A (1 , 2) , find the coordinates of the point B
- 13 Prove that : $\sin^2 30^\circ + \cos^2 30^\circ = \tan 45^\circ$
- 14 Find the length of $\overline{AB}$, where A (2 , 5) and B (- 4 , - 3)
- 15 If the points A (- 3 , 4) , B (5 , - 1) , C (3 , 5) , then find the equation of the straight line that passes through the point A and bisects $\overline{BC}$
- 16 ABC is a right-angled triangle at C and $AB = 13$ cm. , $BC = 12$ cm.
Prove that : $\sin A \cos B + \cos A \sin B = 1$

Answers of model examinations of the school book of algebra & statistics

Model 1

1

- [1] b [2] c [3] b [4] a [5] c [6] b

2

[a] [1] $Y = \{2, 5, 7\}$

[2] $Y \times X = \{(2, 2), (5, 2), (7, 2)\}$

[b] Let $\frac{a}{b} = \frac{c}{d} = m$, where $m > 0$

$\therefore a = bm, c = dm$

$\therefore \text{L.H.S.} = \frac{a}{b-a} = \frac{bm}{bm-dm} = \frac{bm}{b(1-m)} = \frac{m}{1-m}$ (1)

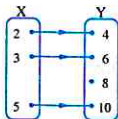
$\therefore \text{R.H.S.} = \frac{c}{d-c} = \frac{dm}{dm-dm} = \frac{dm}{d(1-m)} = \frac{m}{1-m}$ (2)

From (1), (2): $\therefore \frac{a}{b-a} = \frac{c}{d-c}$

3

[a] [1] $R = \{(2, 4), (3, 6), (5, 10)\}$

[2] R is a function because every element of X has only one image in Y



[b] Let the number be X

$\therefore \frac{X+7}{X+11} = \frac{2}{3}$

$\therefore 3X + 21 = 2X + 22 \quad \therefore X = 1$

$\therefore$ The required number is 1

4

[a] [1] The range = $\{3, 1, 5\}$

[2] $a + b = 8$

[b] [1] $\because y \propto \frac{1}{x}$

$\therefore xy = m$

$\therefore m = 2 \times 3 = 6$

$\therefore xy = 6$

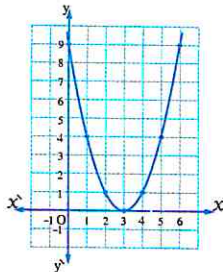
[2] At $X = 1.5$

$\therefore y = \frac{6}{1.5} = 4$

5

[a] $f(x) = (x-3)^2$

x	0	1	2	3	4	5	6
f(x)	9	4	1	0	1	4	9



From the graph :

The vertex of the curve is (3, 0)

$\therefore$ the minimum value = 0

$\therefore$ the equation of the axis of symmetry is : $x = 3$

[b] Form the table by yourself

$\therefore$ then the arithmetic mean = 7

$\therefore$ the standard deviation ≈ 1.41

Model 2

1

- [1] a [2] c [3] d [4] b [5] c [6] a

2

[a] [1] $n(X \times Z) = 2$

[2] $(Y \cap X) \times Z = \{2\} \times \{3\} = \{(2, 3)\}$

[b] $\therefore b$ is the middle proportional between a and c

$\therefore \frac{a}{b} = \frac{b}{c} = m \quad \therefore b = cm, a = cm^2$

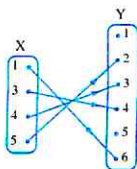
$\therefore \text{L.H.S.} = \frac{a-b}{a-c} = \frac{cm^2-cm}{cm^2-c} = \frac{cm(m-1)}{c(m^2-1)}$
 $= \frac{cm(m-1)}{c(m-1)(m+1)} = \frac{m}{m+1}$ (1)

$\therefore \text{R.H.S.} = \frac{b}{b+c} = \frac{cm}{cm+c} = \frac{cm}{c(m+1)} = \frac{m}{m+1}$ (2)

From (1), (2): $\therefore \frac{a-b}{a-c} = \frac{b}{b+c}$

3

[a] 1 $R = \{(1, 6), (3, 4), (4, 3), (5, 2)\}$



2 R is a function because every element of X has only one image in Y

[b] $\therefore 5a = 3b \quad \therefore \frac{a}{b} = \frac{3}{5}$

$\therefore a = 3m, b = 5m$

$\therefore \frac{7a + 9b}{4a + 2b} = \frac{7 \times 3m + 9 \times 5m}{4 \times 3m + 2 \times 5m} = \frac{66m}{22m} = 3$

4

[a] $\therefore f(x) = 4x + b, f(3) = 15$

$\therefore 4 \times 3 + b = 15 \quad \therefore b = 3$

[b] 1 $\therefore y \propto x \quad \therefore y = mx$

$\therefore 6 = m \times 3 \quad \therefore m = 2$

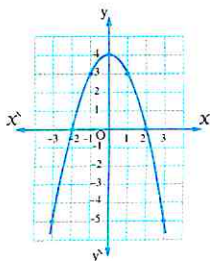
$\therefore y = 2x$

2 At $x = 5 \quad \therefore y = 2 \times 5 = 10$

5

[a] $f(x) = 4 - x^2$

x	-3	-2	-1	0	1	2	3
$f(x)$	-5	0	3	4	3	0	-5



From the graph : The vertex of the curve is $(0, 4)$
 , the maximum value = 4
 , the equation of the axis of symmetry is : $x = 0$

[b] Form the tables by yourself

, then the mean = 2.26

, the standard deviation ≈ 1.06

Model for the merge students

1

1 the first

2 the third

3 30

4 x

5 9

6 9

2

1 a

2 a

3 d

4 b

5 c

6 c

3

1 ✓

2 ✗

3 ✗

4 ✓

5 ✓

6 ✓

4

1 1

2 6

3 8

4 10

5 ± 6

6 2

Answers of governorates' examinations of algebra & statistics

1

Cairo

First Group :

- 1 a 2 b 3 c 4 d 5 b
6 d 7 b 8 c 9 d

Second Group :

- 10 (1) $\because y \propto x \quad \therefore y = mx$
 $\therefore 3 = 6m \quad \therefore m = \frac{1}{2}$
 $\therefore y = \frac{1}{2}x$
(2) When $x = 10 \quad \therefore y = \frac{1}{2} \times 10 = 5$

- 11 $\because \frac{a}{b} = \frac{c}{d} = m$
 $\therefore a = bm, c = dm$
 $\therefore \text{L.H.S.} = \frac{a+b}{c+d} = \frac{bm+dm}{dm+dm} = \frac{b(m+d)}{d(m+d)}$
 $= \frac{b}{d} = \text{R.H.S.}$

- 12 (1) $R = \{(2, 3), (4, 1), (6, 7), (8, 5)\}$

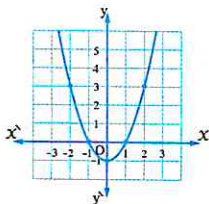
(2) Yes R is a function from X to Y
the range = $\{3, 1, 7, 5\}$

- 13 $\because \frac{x+1}{x+2} = \frac{3}{4} \quad \therefore 3x+6=4x+4$
 $\therefore 6-4=4x-3x \quad \therefore x=2$

- 14 $\because \frac{x}{5} = \frac{y}{6}$
 $\therefore x=5m, y=6m$
 $\therefore \frac{2x+y}{y-x} = \frac{10m+6m}{6m-5m} = \frac{16m}{m} = 16$

- 15 $f(x) = x^2 - 1$

x	-2	-1	0	1	2
f(x)	3	0	-1	0	3



From the graph :

- (1) The vertex of the curve is : $(0, -1)$
(2) The minimum value = -1

- 16 Form the table by yourself

then the mean $(\bar{X}) = 8, \sigma \approx 2.83$

2

Giza

First Group :

- 1 d 2 c 3 b 4 b 5 c
6 a 7 a 8 d 9 b

Second Group :

- 10 Form the table by yourself

then $\sigma \approx 3.29$

- 11 $\because \frac{a+3b}{2a-b} = \frac{4}{3}$
 $\therefore 3a+9b=8a-4b$
 $\therefore 9b+4b=8a-3a$
 $\therefore 13b=5a$

$$\therefore \frac{b}{a} = \frac{5}{13}$$

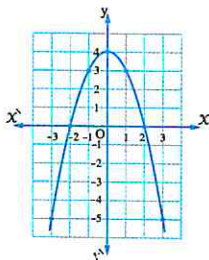
- 12 $\because \frac{x}{4} = \frac{y}{5} = \frac{z}{3} = m$

$$\therefore x=4m, y=5m, z=3m$$

$$\therefore \frac{x-y+2z}{2x+y-z} = \frac{4m-5m+6m}{8m+5m-3m} = \frac{5m}{10m} = \frac{1}{2}$$

- 13 $f(x) = 4 - x$

x	-3	-2	-1	0	1	2	3
f(x)	-5	0	3	4	3	0	-5



From the graph :

- (1) The maximum value = 4
(2) The equation of the axis of symmetry is : $x=0$

$$14) (1) \because y \propto \frac{1}{X} \quad \therefore Xy = m$$

$$\therefore \frac{2}{3} \times 9 = m \quad \therefore m = 6$$

$$\therefore Xy = 6$$

$$(2) \text{ When } X = 2 \quad \therefore 2y = 6$$

$$\therefore y = \frac{6}{2} = 3$$

$$15) \therefore \frac{a}{b} = \frac{b}{c} = m \quad \therefore b = cm, a = cm^2$$

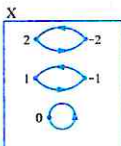
$$\therefore \frac{a+b}{b+c} = \frac{cm^2+cm}{cm+c} = \frac{cm(m+1)}{c(m+1)} = m \quad (1)$$

$$\therefore \frac{a}{b} = \frac{cm^2}{cm} = m \quad (2)$$

$$\text{From (1) and (2): } \therefore \frac{a+b}{b+c} = \frac{a}{b}$$

$$16) (1) R = \{(-2, 2), (-1, 1), (0, 0), (1, -1), (2, -2)\}$$

(2) R is a function on X because each element in X has only one image in X



3

Alexandria

First Group :

$$1) a \quad 2) b \quad 3) a \quad 4) a \quad 5) a$$

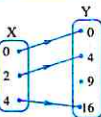
$$6) a \quad 7) b \quad 8) a \quad 9) c$$

Second Group :

$$12) R = \{(0, 0), (2, 4), (4, 16)\}$$

Yes, R is a function

the range = $\{0, 4, 16\}$



$$11) (1) \because y \propto X \quad \therefore y = mX$$

$$\therefore 6 = 3m \quad \therefore m = 2$$

$$\therefore y = 2X$$

$$(2) \text{ When } X = 5 \quad \therefore y = 2 \times 5 = 10$$

$$12) \text{ Let the number be : } X$$

$$\therefore \frac{5+X}{7+X} = \frac{3}{4} \quad \therefore 20 + 4X = 21 + 3X$$

$$\therefore 4X - 3X = 21 - 20 \quad \therefore X = 1$$

$\therefore$ The number is : 1

$$13) \therefore \frac{a}{b} = \frac{b}{c} = m \quad \therefore b = cm, a = cm^2$$

$$\therefore \frac{b}{c+b} = \frac{cm}{c+cm} = \frac{cm}{c(1+m)} = \frac{m}{1+m} \quad (1)$$

$$\therefore \frac{a}{b+a} = \frac{cm^2}{cm+cm^2} = \frac{cm^2}{cm(1+m)} = \frac{m}{1+m} \quad (2)$$

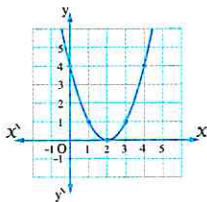
$$\text{From (1) and (2): } \therefore \frac{b}{c+b} = \frac{a}{b+a}$$

$$14) \therefore \frac{X}{y} = \frac{2}{3} \quad \therefore X = 2m, y = 3m$$

$$\therefore \frac{3X+2y}{6y-X} = \frac{6m+6m}{18m-2m} = \frac{12m}{16m} = \frac{3}{4}$$

$$15) f(X) = (X-2)^2 = X^2 - 4X + 4$$

X	0	1	2	3	4
f(X)	4	1	0	1	4



From the graph :

(1) The equation of the axis of symmetry is : $X = 2$

(2) The minimum value = 0

$$16) \text{ Form the table by yourself}$$

$\therefore$ then the mean $(\bar{X}) = 16$, $\sigma = 3.29$

4

El-Kalyoubia

First Group :

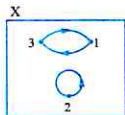
$$1) a \quad 2) b \quad 3) d \quad 4) b \quad 5) d$$

$$6) d \quad 7) a \quad 8) b \quad 9) a$$

Second Group :

$$10) (1) R = \{(1, 3), (2, 2), (3, 1)\}$$

(2) R is a function on X because every element in X has only one image in X



$$11) \therefore \frac{a}{b} = \frac{b}{c} = m \quad \therefore b = cm, a = cm^2$$

$$\therefore \frac{a+b}{b+c} = \frac{cm^2+cm}{cm+c} = \frac{cm(m+1)}{c(m+1)} = m \quad (1)$$

$$\therefore \frac{a}{b} = \frac{cm^2}{cm} = m \quad (2)$$

$$\text{From (1) and (2): } \therefore \frac{a+b}{b+c} = \frac{a}{b}$$

$$\begin{aligned} (12) \quad \therefore \frac{a}{b} &= \frac{c}{d} = m & \therefore a = bm, c = dm \\ \therefore \frac{3a+2c}{3b+2d} &= \frac{3bm+2dm}{3b+2d} = \frac{m(3b+2d)}{3b+2d} = m \quad (1) \end{aligned}$$

$$\therefore \frac{5a-c}{5b-d} = \frac{5bm-dm}{5b-d} = \frac{m(5b-d)}{5b-d} = m \quad (2)$$

$$\text{From (1) and (2): } \therefore \frac{3a+2c}{3b+2d} = \frac{5a-c}{5b-d}$$

(13) (1) Direct variation

$$(2) \therefore y \propto x \quad \therefore y = mx \quad \therefore 4 = 2m$$

$$\therefore m = 2 \quad \therefore y = 2x$$

$$(3) \text{ When } y = 7 \quad \therefore 7 = 2x \quad \therefore x = \frac{7}{2}$$

$$(14) \therefore \frac{x}{3} = \frac{y}{z} = \frac{z}{5} = \frac{3x-2y+5z}{5k}$$

, multiplying the two terms of the 1st ratio by (3) and the 2nd by (-2) and the 3rd by (5) and adding the antecedents and consequents of the three ratios.

$$\therefore \frac{3x-2y+5z}{9-4+25} = \text{one of the given ratios.}$$

$$\therefore \frac{3x-2y+5z}{30} = \frac{3x-2y+5z}{5k}$$

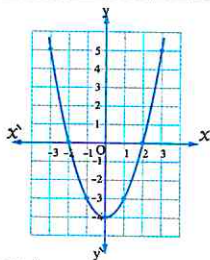
$$\therefore 30 = 5k \quad \therefore k = 6$$

(15) Form the table by yourself

, then $\sigma \approx 2.16$

$$(16) f(x) = x^2 - 4$$

x	-3	-2	-1	0	1	2	3
$f(x)$	5	0	-3	-4	-3	0	5



From the graph :

(1) The vertex of the curve is : (0, -4)

(2) The minimum value = -4

5

El-Sharkia

First Group :

- [1] a [2] b [3] d [4] c [5] d
 [6] a [7] c [8] d [9] c

Second Group :

$$(10) (1) \therefore y \propto \frac{1}{x} \quad \therefore xy = m$$

$$\therefore 3 \times 4 = m \quad \therefore m = 12$$

$$\therefore xy = 12$$

$$(2) \text{ Where } y = 6 \quad \therefore 6x = 12$$

$$\therefore x = \frac{12}{6} = 2$$

$$(11) (1) \text{ Let } A = (x, 0) \quad \therefore x = \frac{-b}{2a} = \frac{8}{2} = 4$$

$$\therefore A = (4, 0)$$

$$(2) \therefore \text{The area of } \triangle ABO = \frac{1}{2} \times AO \times AB$$

$$\therefore 8\sqrt{3} = \frac{1}{2} \times 4 \times AB$$

$$\therefore AB = \frac{8\sqrt{3}}{2} = 4\sqrt{3} \text{ length unit}$$

$$\therefore B = (4, 4\sqrt{3})$$

$\therefore$ The rule of the function which represent $\overline{OB}$ is : $g(x) = bx + c$

$$\therefore O = (0, 0) \in \overline{OB} \quad \therefore g(x) = bx$$

$$\therefore B(4, 4\sqrt{3}) \quad \therefore 4\sqrt{3} = b \times 4$$

$$\therefore b = \sqrt{3} \quad \therefore g(x) = \sqrt{3}x$$

$$(12) \therefore \frac{a}{b} = \frac{c}{d} = m \quad \therefore a = bm, c = dm$$

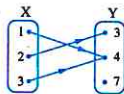
$$\therefore \frac{3a-2c}{3b-2d} = \frac{3bm-2dm}{3b-2d} = \frac{m(3b-2d)}{3b-2d} = m \quad (1)$$

$$\therefore \frac{5a+3c}{5b+3d} = \frac{5bm+3dm}{5b+3d} = \frac{m(5b+3d)}{5b+3d} = m \quad (2)$$

$$\text{From (1) and (2): } \therefore \frac{3a-2c}{3b-2d} = \frac{5a+3c}{5b+3d}$$

$$(13) R = \{(1, 4), (2, 3), (3, 4)\}$$

$\therefore R$ is a function from X to Y because every element in X has only one image in Y



(14) Let the number be : x

$$\therefore \frac{49-3x}{69-3x} = \frac{2}{3} \quad \therefore 147-9x = 138-6x$$

$$\therefore 147-138 = -6x+9x$$

$$\therefore 9 = 3x$$

$$\therefore x = 3$$

$\therefore$ The number is : 3

$$(15) \therefore \frac{a}{3} = \frac{b}{4} = \frac{c}{5} = m$$

$$\therefore a = 3m, b = 4m, c = 5m$$

$$\therefore \frac{2b-c}{3a-2b+c} = \frac{8m-5m}{9m-8m+5m} = \frac{3m}{6m} = \frac{1}{2}$$

16 Form the table by yourself

, then the mean ($\bar{X}$) = 10, $\sigma \approx 1.41$

6

El-Monofia

First Questions :

- [a] (1) b (2) d (3) a
- [b] (1) $\therefore y \propto \frac{1}{X}$ $\therefore Xy = m$
 $\therefore 3 \times 2 = m$ $\therefore m = 6$
 $\therefore Xy = 6$
- (2) When $X = 4$ $\therefore 4y = 6$
 $\therefore y = \frac{6}{4} = 1.5$

Second Questions :

- [a] (1) c (2) c (3) a
- [b] $\therefore b$ is the middle proportional between a and c
 $\therefore b^2 = ac$
 $\therefore \text{L.H.S} = \frac{a^2}{b^2} + \frac{b^2}{c^2} = \frac{a^2}{ac} + \frac{ac}{c^2} = \frac{a}{c} + \frac{a}{c}$
 $= \frac{2a}{c} = \text{R.H.S.}$

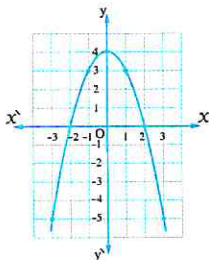
Third Questions :

- [a] (1) b (2) b (3) c
- [b] (1) $R = \{(1, 5), (2, 4), (3, 3)\}$
- (2) Yes R is a function from X to Y because every element in X has only one image in Y

Fourth Questions :

- [a] $f(X) = 4 - X^2$

X	-3	-2	-1	0	1	2	3
$f(X)$	-5	0	3	4	3	0	-5



From the graph :

- (1) The equation of the axis of symmetry is : $X = 0$
 (2) The maximum value = 4

[b] $\therefore \frac{X}{y} = \frac{2}{3}$
 $\therefore X = 2m, y = 3m$
 $\therefore \frac{3X - y}{2X + y} = \frac{6m - 3m}{4m + 3m} = \frac{3m}{7m} = \frac{3}{7}$

Fifth Questions :

- [a] Let the number be : X
 $\therefore \frac{7+X}{11+X} = \frac{4}{5}$ $\therefore 35 + 5X = 44 + 4X$
 $\therefore 5X - 4X = 44 - 35$ $\therefore X = 9$
 $\therefore$ The number is : 9

- [b] Form the table by yourself

, then the mean ($\bar{X}$) = 5
 $\sigma \approx 1.41$

7

El-Gharbia

First Group :

- [1] c [2] d [3] b [4] a [5] c
 [6] d [7] b [8] c [9] a

Second Group :

- [10] (1) $X \times Y = \{(2, 4), (-1, 4)\}$
 (2) $n(Y^2) = 1^2 = 1$
 (3) $X^2 = \{(2, 2), (2, -1), (-1, 2), (-1, -1)\}$
- [11] $\therefore \frac{X}{y} = \frac{2}{3}$ $\therefore X = 2m, y = 3m$
 $\therefore \frac{3X + 2y}{6y - X} = \frac{6m + 6m}{18m - 2m} = \frac{12m}{16m} = \frac{3}{4}$
- [12] Form the table by yourself
 , then $\sigma \approx 2.45$
- [13] (1) $\therefore y \propto \frac{1}{X}$ $\therefore Xy = m$
 $\therefore 3 \times 2 = m$ $\therefore m = 6$
 $\therefore Xy = 6$
- (2) When $X = 1.5$ $\therefore 1.5y = 6$
 $\therefore y = \frac{6}{1.5} = 4$
- [14] $\therefore \frac{a}{b} = \frac{b}{c} = m$ $\therefore b = cm, a = cm^2$
 $\therefore \frac{a-b}{a-c} = \frac{cm^2 - cm}{cm^2 - c} = \frac{cm(m-1)}{c(m^2-1)}$
 $= \frac{cm(m-1)}{c(m-1)(m+1)} = \frac{m}{m+1}$ (1)

$$\therefore \frac{b}{b+c} = \frac{cm}{cm+c} = \frac{cm}{c(m+1)} = \frac{m}{m+1}$$

From (1) and (2) : $\therefore \frac{a-b}{b-c} = \frac{b}{b+c}$

[15] Let the number be : X

$$\therefore \frac{3+X^2}{8-X^2} = \frac{7}{4}$$

$$\therefore 12 + 4X^2 = 56 - 7X^2$$

$$\therefore 4X^2 + 7X^2 = 56 - 12$$

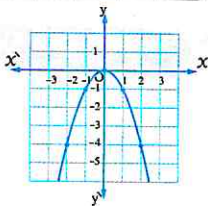
$$\therefore 11X^2 = 44 \quad \therefore X^2 = 4$$

$$\therefore X = 2 \text{ or } X = -2 \text{ (refused)}$$

$$\therefore \text{The number is : } 2$$

[16] $f(X) = -X^2$

X	-2	-1	0	1	2
$f(X)$	-4	-1	0	-1	-4



From the graph :

(1) The equation of the axis of symmetry is : $X = 0$

(2) The maximum value = 0

8

El-Dakahlia

First Questions :

[a] $\therefore v \propto \frac{1}{r^2}$

$$\therefore \frac{v_1}{v_2} = \frac{r_2^2}{r_1^2}$$

$$\therefore \frac{5}{v_2} = \frac{(2.5)^2}{(3)^2}$$

$$\therefore v_2 = \frac{5 \times (3)^2}{(2.5)^2}$$

$$\therefore v_2 = 7.2 \text{ cm/sec.}$$

[b] $\therefore \frac{X+2y}{a+4b} = \frac{2y+5z}{4b+7c} = \frac{5z+X}{7c+a}$

multiplying the two terms of the 2nd ratio by (-1) and adding the antecedents and consequents of the three ratios.

$$\therefore \frac{X+2y-2y-5z+5z+X}{a+4b-4b-7c+a} = \frac{2X}{2a} = \frac{X}{a}$$

= one of the given ratios.

multiplying the two terms of the 3rd ratio by (-1) and adding the antecedents and consequents of the three ratios.

(1)

(2)

$$\therefore \frac{X+2y+2y+5z-5z-X}{a+4b+4b+7c-7c-a} = \frac{4y}{8b} = \frac{y}{2b}$$

= one of the given ratios.

(2)

From (1) and (2) : $\therefore \frac{X}{a} = \frac{y}{2b}$

$$\therefore \frac{X}{y} = \frac{a}{2b}$$

Second Questions :

[a] (1) b

(2) c

(3) a

[b] (1) $\therefore X = z + 9$, $z \propto y$

$$\therefore z = my$$

$$\therefore X = my + 9$$

$$\text{when } X = 24 \text{ , } y = 5$$

$$\therefore 24 = 5m + 9$$

$$\therefore 5m = 15$$

$$\therefore m = 3$$

$$\therefore X = 3y + 9$$

(2) $\therefore z = my$, $m = 3$

$$\therefore z = 3y$$

$$\therefore \text{when } z = 12$$

$$\therefore 12 = 3y$$

$$\therefore y = \frac{12}{3} = 4$$

Third Questions :

[a] $\therefore a, 6, b, 54$ are in continued proportion

$$\therefore \frac{a}{6} = \frac{6}{b} = \frac{b}{54}$$

$$\therefore b^2 = 6 \times 54 = 324$$

$$\therefore b = 18 \text{ or } b = -18 \text{ (refused)}$$

$$\therefore \frac{a}{6} = \frac{6}{18}$$

$$\therefore a = \frac{6 \times 6}{18} = 2$$

[b] (1) $\therefore$ The area of $\Delta ABC = \frac{1}{2} \times AB \times CO$

$$\therefore 3 = \frac{1}{2} \times 2 \times CO$$

$$\therefore CO = 3 \text{ Length units} \quad \therefore C = (0, 3)$$

$\therefore$ The equation of the axis of symmetry is : $X = 2$

$\therefore AB = 2 \text{ length units}$

$$\therefore A = (1, 0), B = (3, 0)$$

$$\therefore C \in g(X) \quad \therefore g(0) = 0 + k = 3$$

$$\therefore k = 3$$

$$\therefore B \in g(X) \quad \therefore g(X) = mX + 3$$

$$\therefore g(3) = 3m + 3 = 0$$

$$\therefore 3m = -3$$

$$\therefore m = -1$$

$$\therefore g(X) = -X + 3$$

$$(2) g(4) = -4 + 3 = -1$$

Fourth Questions :

[a] (1) b

(2) d

(3) c

[b] Form the table by yourself , then $\sigma \approx 2.83$

Fifth Questions :

- [a] (1) b (2) c (3) b
 [b] (1) $R = \{(1, 8), (2, 4), (4, 2), (8, 1)\}$
 (2) $\therefore (2, 4) \in R, m R 4 \therefore m = 2$

9

Ismailia

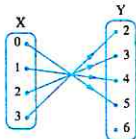
First Group :

- [1] d [2] b [3] c [4] d [5] a
 [6] c [7] b [8] a [9] d

Second Group :

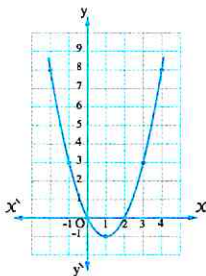
- [10] (1) $R = \{(0, 5), (1, 4), (2, 3), (3, 2)\}$

(2) Yes, R is a function from X to Y because every element in Y has only one image in Y



- [11] $\therefore X \propto \frac{1}{y}$
 (1) when $y = 1.5$
 $\therefore \frac{12}{X_2} = \frac{1.5}{8}$
 $\therefore X_2 = \frac{12 \times 8}{1.5} = 64$
 (2) When $X = 2$
 $\therefore \frac{12}{2} = \frac{y_2}{8}$
 $\therefore y_2 = \frac{12 \times 8}{2} = 48$
 [12] $f(x) = x^2 - 2x$

x	-2	-1	0	1	2	3	4
$f(x)$	8	3	0	-1	0	3	8



From the graph :

- (1) The vertex of the curve is : $(1, -1)$
 (2) The minimum value = -1
 (3) The equation of the axis of symmetry is : $x = 1$

- [13] $\therefore \frac{x-2y}{x+3y} = \frac{1}{2} \therefore x+3y = 2x-4y$
 $\therefore 3y+4y = 2x-x \therefore 7y = x$
 $\therefore \frac{y}{x} = \frac{1}{7}$
 [14] $\therefore \frac{x}{2} = \frac{y}{5} = \frac{z}{7} = m$
 $\therefore x = 2m, y = 5m, z = 7m$
 $\therefore \text{L.H.S.} = \frac{5y-3z}{2z-3x} = \frac{25m-21m}{14m-6m} = \frac{4m}{8m} = \frac{1}{2} = \text{R.H.S.}$

- [15] $\therefore b$ is the middle proportional between a and c
 $\therefore b^2 = ac$
 $\therefore \text{L.H.S.} = \frac{a^2}{b^2} + \frac{b^2}{c^2} = \frac{a^2}{ac} + \frac{ac}{c^2} = \frac{a}{c} + \frac{a}{c} = \frac{2a}{c} = \text{R.H.S.}$

- [16] Form the table by yourself, then $\sigma = 4$

10

Port Said

First Group :

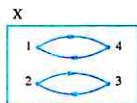
- [1] a [2] c [3] d [4] c [5] a
 [6] c [7] c [8] c [9] d

Second Group :

- [10] $\therefore y \propto \frac{1}{x}$
 $\therefore \frac{y_1}{y_2} = \frac{X_2}{X_1}$
 $\therefore \frac{8}{y_2} = \frac{4}{3}$
 $\therefore y_2 = \frac{8 \times 3}{4} = 6$
 [11] $\therefore \frac{x}{3} = \frac{y}{4} = m$
 $\therefore x = 3m, y = 4m$
 $\therefore \frac{x+y}{2x-y} = \frac{3m+4m}{6m-4m} = \frac{7m}{2m} = \frac{7}{2}$
 [12] $\therefore \frac{a}{b} = \frac{c}{d} = m \therefore a = bm, c = dm$
 $\therefore \text{L.H.S.} = \frac{a+b}{c+d} = \frac{bm+dm}{dm+dm} = \frac{b(m+d)}{d(m+d)} = \frac{b}{d} = \text{R.H.S.}$

- [13] $R = \{(1, 4), (2, 3), (3, 2), (4, 1)\}$

Yes, R is a function on X because every element in X has only one image in X



- [14] Form the table by yourself
 then the mean ($\bar{X}$) = 8
 $\therefore \sigma = 4.24$

- [15] (1) The vertex of the curve is : (0, 4)
 (2) The equation of the axis of symmetry is : $X = 0$
 (3) The maximum value = 4

[16] $\therefore \frac{a+3b}{3} = \frac{2b+c}{2}$

$\therefore 6b + 3c = 2a + 6b \quad \therefore 3c = 2a$

$\therefore a = \frac{3}{2}c \quad \therefore a \propto c$

11

Damietta

First Questions :

- [a] (1) a (2) d

- (3) c

[b] $\therefore \frac{a}{b} = \frac{b}{c} = m \quad \therefore b = cm, a = cm^2$

$\therefore \frac{a}{c} = \frac{cm^2}{c} = m^2 \quad (1)$

$\therefore \frac{b^2}{c^2} = \frac{c^2 m^2}{c^2} = m^2 \quad (2)$

From (1) and (2) : $\therefore \frac{a}{c} = \frac{b^2}{c^2}$

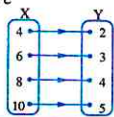
Second Questions :

- [a] (1) b (2) d

- (3) c

[b] $R = \{(4, 2), (6, 3), (8, 4), (10, 5)\}$

Yes, R is a function from X to Y



Third Questions :

- [a] (1) b (2) d

- (3) a

[b] (1) $\therefore y \propto \frac{1}{X} \quad \therefore XY = m$

$\therefore 3 \times 2 = m \quad \therefore m = 6$

$\therefore XY = 6$

(2) When $y = 6 \quad \therefore 6X = 6$

$\therefore X = 1$

Fourth Questions :

[a] $\therefore \frac{5y-3X}{3y+5X} = 1 \quad \therefore 5y-3X = 3y+5X$

$\therefore 5y-3y = 5X+3X \quad \therefore 2y = 8X$

$\therefore y = 4X \quad \therefore y \propto X$

- [b] Let the number be : X

$\therefore \frac{3+X}{5+X} = \frac{8+X}{12+X}$

$\therefore (3+X)(12+X) = (5+X)(8+X)$

$\therefore 36 + 15X + X^2 = 40 + 13X + X^2$

$\therefore 15X - 13X = 40 - 36$

$\therefore 2X = 4 \quad \therefore X = 2$

$\therefore$ The number is : 2

Fifth Questions :

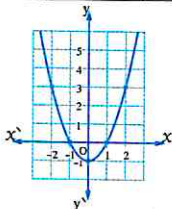
- [a] Form the table by yourself

$\therefore$ then the mean ($\bar{X}$) = 5

$\therefore \sigma \approx 2.83$

- [b] $f(X) = X^2 - 1$

X	-2	-1	0	1	2
$f(X)$	3	0	-1	0	3



From the graph :

- (1) The minimum value = -1

- (2) The equation of the axis of symmetry is : $X = 0$

12

El-Beheira

First Group :

[1] a [2] d [3] d [4] a [5] a

[6] c [7] d [8] c [9] b

Second Group :

- [10] Let the two numbers be : a, b

$\therefore \frac{a}{b} = \frac{3}{7} \quad \therefore a = 3m, b = 7m$

$\therefore \frac{3m-5}{7m-5} = \frac{1}{3} \quad \therefore 9m-15 = 7m-5$

$\therefore 9m-7m = -5+15$

$\therefore 2m = 10 \quad \therefore m = 5$

$\therefore$ The numbers are 15 and 35

- [11] (1) $\therefore a \propto b \quad \therefore a = mb$

$\therefore 20 = 7m \quad \therefore m = \frac{20}{7}$

$\therefore a = \frac{20}{7}b$

(2) When $a = 40$ $\therefore 40 = \frac{20}{7} b$

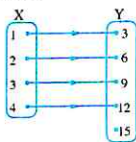
$\therefore b = 40 \times \frac{7}{20} = 14$

12 Form the table by yourself

, then the mean ($\bar{X}$) = 16, $\sigma = 4.43$

13 (1) $R = \{(1, 3), (2, 6), (3, 9), (4, 12)\}$

(2) R is a function from X to Y because every element in X has only one image in Y



14 $\therefore \frac{a}{b} = \frac{c}{d} = m$ $\therefore a = bm$, $c = dm$

$\therefore \frac{a}{b-a} = \frac{bm}{b-bm} = \frac{bm}{b(1-m)} = \frac{m}{m-1}$ (1)

$\therefore \frac{c}{d-c} = \frac{dm}{d-dm} = \frac{dm}{d(m-1)} = \frac{m}{m-1}$ (2)

From (1) and (2) : $\therefore \frac{a}{b-a} = \frac{c}{d-c}$

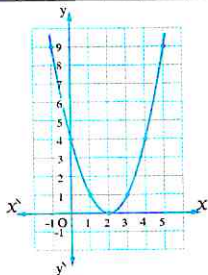
15 $\therefore a, b, c$ are in continued proportion

$\therefore b^2 = ac$

$\therefore$ L.H.S. = $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a^2 + ac}{ac + c^2} = \frac{a(a+c)}{c(a+c)} = \frac{a}{c} =$ R.H.S.

16 $f(x) = (x-2)^2 = x^2 - 4x + 4$

x	-1	0	1	2	3	4	5
$f(x)$	9	4	1	0	1	4	9



From the graph :

(1) The vertex of the curve is : (2, 0)

(2) The equation of the axis of symmetry is : $x = 2$

(3) The minimum value = 0

13

El-Fayoum

First Questions :

1 c

2 c

3 c

4 c

5 d

6 c

Second Questions :

a Form the table by yourself

, then $\sigma \approx 1.41$

b $\therefore \frac{a}{b} = \frac{b}{c} = m$ $\therefore b = cm$, $a = cm^2$

$\therefore \left(\frac{b-c}{a-b}\right)^2 = \left(\frac{cm-c}{cm^2-cm}\right)^2 = \left(\frac{c(m-1)}{cm(m-1)}\right)^2 = \left(\frac{1}{m}\right)^2 = \frac{1}{m^2}$ (1)

$\therefore \frac{c}{a} = \frac{c}{cm^2} = \frac{1}{m^2}$ (2)

From (1) and (2) : $\therefore \left(\frac{b-c}{a-b}\right)^2 = \frac{c}{a}$

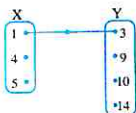
Third Questions :

a $R = \{(1, 3)\}$

No, R is not a function

because each of $4 \in X$ and

$5 \in X$ has no image in Y



b (1) $(Y \cap Z) \times X = \{5\} \times \{3\} = \{(5, 3)\}$

(2) $(X - Y) \times Z = \{3\} \times \{5, 6\} = \{(3, 5), (3, 6)\}$

(3) $n(X^2) = 1^2 = 1$

Fourth Questions :

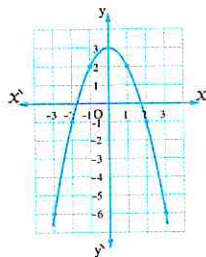
a (1) $\therefore y \propto x$ $\therefore y = mx$

$\therefore 20 = 4m$ $\therefore m = 5$ $\therefore y = 5x$

(2) When $y = 40$ $\therefore 40 = 5x$ $\therefore x = \frac{40}{5} = 8$

b $f(x) = 3 - x^2$

x	-3	-2	-1	0	1	2	3
$f(x)$	-6	-1	2	3	2	-1	-6



From the graph :

- (1) The vertex of the curve is : (0, 3)
(2) The maximum value = 3

Fifth Questions :

[a] $\therefore \frac{x}{3} = \frac{y}{4} = \frac{z}{5} = m$

$\therefore x = 3m, y = 4m, z = 5m$

$\therefore \frac{2y-z}{3x-2y+z} = \frac{8m-5m}{9m-8m+5m} = \frac{3m}{6m} = \frac{1}{2}$

- [b] (1) d (2) d (3) d

14

Beni Suef

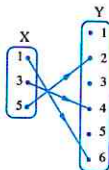
First Group :

- [1] c [2] a [3] d [4] b [5] a
[6] d [7] d [8] c [9] b

Second Group :

[10] $R = \{(1, 6), (3, 4), (5, 2)\}$

Yes, R is a function from X to Y because every element in X has only one image in Y



[11] $\therefore \frac{x}{2} = \frac{y}{3} = \frac{z}{4} = \frac{3x+2y-z}{k}$

, multiplying the two terms of the 1st ratio by (3)
, the 2nd by (2), the 3rd by (-1) and adding the antecedents and consequents of the three ratios.

$\therefore \frac{3x+2y-z}{6+6-4} = \text{one of the given ratios.}$

$\therefore \frac{3x+2y-z}{8} = \frac{3x+2y-z}{k} \therefore k = 8$

[12] $\therefore y \propto x^2$

$\therefore y = mx^2$

$\therefore 36 = m(3)^2$

$\therefore m = \frac{36}{9} = 4$

$\therefore y = 4x^2$

When $x = 2$

$\therefore y = 4 \times 2^2 = 16$

[13] Let the number be : x

$\therefore \frac{15-x}{13+x} = \frac{3}{4}$

$\therefore 60 - 4x = 39 + 3x$

$\therefore 60 - 39 = 3x + 4x \therefore 7x = 21$

$\therefore x = 3$

$\therefore \text{The number is : } 3$

[14] Form the table by yourself

, then $(\bar{X}) = 16$

$\therefore \sigma = 3.29$

[15] $\therefore \frac{a}{b} = \frac{b}{c} = m \therefore b = cm, a = cm^2$

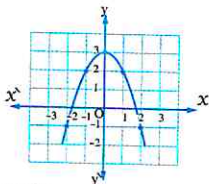
$\therefore \frac{a+2b}{b+2c} = \frac{cm^2+2cm}{cm+2c} = \frac{cm(m+2)}{c(m+2)} = m$ (1)

$\therefore \frac{a-b}{b-c} = \frac{cm^2-cm}{cm-c} = \frac{cm(m-1)}{c(m-1)} = m$ (2)

From (1) and (2) : $\therefore \frac{a+2b}{b+2c} = \frac{a-b}{b-c}$

[16] $f(x) = 3 - x^2$

x	-2	-1	0	1	2
$f(x)$	-1	2	3	2	-1



From the graph :

- (1) The vertex of the curve is : (0, 3)
(2) The maximum value = 3
(3) The equation of the axis of symmetry is : $x = 0$

15

El-Menia

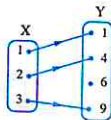
First Group :

- [1] b [2] c [3] a [4] d [5] c
[6] b [7] c [8] d [9] c

Second Group :

[10] $R = \{(1, 1), (2, 4), (3, 9)\}$

R is a function from X to Y because every element in X has only one image in Y



[11] $\therefore y \propto \frac{1}{x}$

$\therefore xy = m$

$\therefore 3 \times 2 = m$

$\therefore m = 6$

$\therefore xy = 6$

[12] Let the number be : x

$\therefore \frac{7+x}{11+x} = \frac{2}{3}$

$\therefore 21 + 3x = 22 + 2x$

$\therefore 3x - 2x = 22 - 21 \therefore x = 1$

$\therefore \text{The number is : } 1$

$$13 \therefore \frac{x}{y} = \frac{2}{3} \quad \therefore x = 2m, y = 3m$$

$$\therefore \frac{3x + 2y}{6y - x} = \frac{6m + 6m}{18m - 2m} = \frac{12m}{16m} = \frac{3}{4}$$

$$14 \therefore \frac{a}{b} = \frac{b}{c} = m \quad \therefore b = cm, a = cm^2$$

$$\therefore \frac{a-b}{a} = \frac{cm^2 - cm}{cm^2} = \frac{cm(m-1)}{cm^2} = \frac{m-1}{m} \quad (1)$$

$$\therefore \frac{a-c}{a+b} = \frac{cm^2 - c}{cm^2 - cm} = \frac{c(m^2 - 1)}{cm(m+1)}$$

$$= \frac{c(m-1)(m+1)}{cm(m+1)} = \frac{m-1}{m} \quad (2)$$

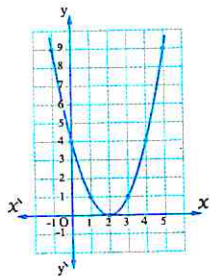
$$\text{From (1) and (2): } \therefore \frac{a-b}{a} = \frac{a-c}{a+b}$$

15 Form the table by yourself

, then $\sigma \approx 3.29$

$$16 f(x) = (x-2)^2 = x^2 - 4x + 4$$

x	-1	0	1	2	3	4	5
f(x)	9	4	1	0	1	4	9



From the graph :

- (1) The vertex of the curve is : $(2, 0)$
- (2) The equation of the axis of symmetry is : $x = 2$
- (3) The minimum value = 0

16

Assiut

First Group :

- 1 c 2 d 3 d 4 c 5 c
6 b 7 a 8 b 9 b

Second Group :

$$10 \therefore \frac{a}{b} = \frac{c}{d} = m \quad \therefore a = bm, c = dm$$

$$\therefore \frac{a+b}{b} = \frac{bm+b}{b} = \frac{b(m+1)}{b} = m+1 \quad (1)$$

$$\therefore \frac{c+d}{d} = \frac{dm+d}{d} = \frac{d(m+1)}{d} = m+1 \quad (2)$$

$$\text{From (1) and (2): } \therefore \frac{a+b}{b} = \frac{c+d}{d}$$

11 Let the two numbers be a and b

$$\therefore \frac{a}{b} = \frac{2}{3} \quad \therefore a = 2m, b = 3m$$

$$\therefore \frac{2m+7}{3m-12} = \frac{5}{3} \quad \therefore 6m+21 = 15m-60$$

$$\therefore 21+60 = 15m-6m \quad \therefore 81 = 9m$$

$$\therefore m = 9$$

\therefore The two numbers are : 18, 27

12 Form the table by yourself

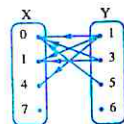
, then $\sigma \approx 7.07$

$$13 R = \{(0, 1), (0, 3),$$

$$(0, 5), (1, 1),$$

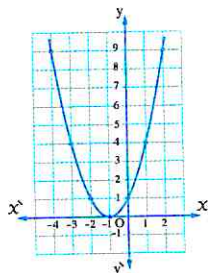
$$(1, 3), (4, 1)\}$$

No, R is not a function because each of $0 \in X, 1 \in X$ has more than one image in Y



$$14 f(x) = x^2 + 2x + 1$$

x	-4	-3	-2	-1	0	1	2
f(x)	9	4	1	0	1	4	9



From the graph :

- (1) The equation of the axis of symmetry is : $x = -1$
- (2) The minimum value = 0

$$15 \therefore \frac{a}{b} = \frac{b}{c} = m \quad \therefore b = cm, a = cm^2$$

$$\therefore \frac{a+b+c}{a^{-1}+b^{-1}+c^{-1}} = \frac{cm^2+cm+c}{c^{-1}m^{-2}+c^{-1}m^{-1}+c^{-1}}$$

$$= \frac{c(m^2+m+1)}{c^{-1}m^{-2}(1+m+m^2)} = c \times cm^2$$

$$= c^2 m^2 = b^2 = R.H.S$$

16 (1) $\therefore d = 9.8 t$

$\therefore$ The variation is direct.

(2) When $t = 2$ seconds

$\therefore d = 9.8 \times 2 = 19.6$ meter.

17

Souhag

First Group :

- 1 b 2 c 3 b 4 a 5 c
6 a 7 c 8 c 9 b

Second Group :

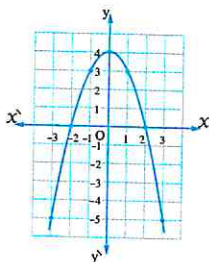
10 Form the table by yourself

$\therefore$ then $(\bar{X}) = 20$

$\therefore \sigma \approx 5.4$

11 $f(X) = 4 - X^2$

X	-3	-2	-1	0	1	2	3
$f(X)$	-5	0	3	4	3	0	-5



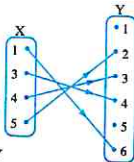
From the graph :

(1) The equation of the axis of symmetry is : $X = 0$

(2) The maximum value = 4

12 (1) $R = \{(1, 6), (3, 4), (4, 3), (5, 2)\}$

(2) Yes, R is a function from X to Y because every element in X has only one image in Y



13 $\therefore b$ is the middle proportional between a and c
 $\therefore b^2 = ac$

$\therefore$ L.H.S. $= \frac{2c^2 - 3b^2}{2b^2 - 3a^2} = \frac{2c^2 - 3ac}{2ac - 3a^2} = \frac{c(2c - 3a)}{a(2c - 3a)} = \frac{c}{a} = \text{R.H.S.}$

14 $\therefore \frac{X}{2} = \frac{y}{3} = \frac{z}{4} = m$

$\therefore X = 2m, y = 3m, z = 4m$

$\therefore$ L.H.S. $= \frac{2X - y + 5z}{3y - X} = \frac{4m - 3m + 20m}{9m - 2m} = \frac{21m}{7m} = 3 = \text{R.H.S.}$

15 (1) $\therefore y \propto \frac{1}{X}$

$\therefore Xy = m$

$\therefore 4 \times 3 = m$

$\therefore m = 12$

$\therefore Xy = 12$

(1) When $y = 6$

$\therefore 6X = 12$

$\therefore X = 2$

16 Let the number be : X

$\therefore \frac{49 - 3X}{69 - 3X} = \frac{2}{3}$

$\therefore 147 - 9X = 138 - 6X$

$\therefore 147 - 138 = -6X + 9X$

$\therefore 9 = 3X$

$\therefore X = 3$

$\therefore$ The number is : 3

18

Qena

First Group :

- 1 c 2 a 3 b 4 b 5 c
6 a 7 c 8 c 9 d

Second Group :

10 $\therefore \frac{a}{b} = \frac{b}{c} = m$

$\therefore b = cm, a = cm^2$

$\therefore \left(\frac{b-c}{a-b}\right)^2 = \left(\frac{cm-c}{cm^2-cm}\right)^2 = \left(\frac{c(m-1)}{cm(m-1)}\right)^2$

$= \frac{1}{m^2} \quad (1)$

$\therefore \frac{c}{a} = \frac{c}{cm^2} = \frac{1}{m^2}$

(2)

From (1) and (2) : $\therefore \left(\frac{b-c}{a-b}\right)^2 = \frac{c}{a}$

11 (1) The range of the function = $\{3, 5\}$

(2) $\therefore R$ is a function on X

$\therefore$ Each element in X has to appear only once as a first projection in R

$\therefore a = 3, b = 1$

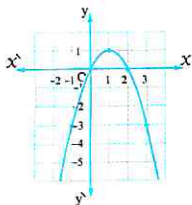
$\therefore a - b = 2$

or $a = 1, b = 3$

$\therefore a - b = -2$

12 $f(X) = 2X - X^2$

X	-1	0	1	2	3
$f(X)$	-3	0	1	0	-3



From the graph :

- (1) The vertex of the curve is : $(1, 1)$
- (2) The maximum value = 1
- (3) The equation of the axis of symmetry is : $X = 1$

$$13 \therefore y \propto \frac{1}{X^2} \quad \therefore y X^2 = m$$

$$\therefore 5 \times 4^2 = m \quad \therefore m = 80$$

$$\therefore X^2 y = 80$$

$$\text{When } X = 2 \quad \therefore 2^2 \times y = 80$$

$$\therefore 4 y = 80 \quad \therefore y = \frac{80}{4} = 20$$

$$14 \therefore \frac{a}{b} = \frac{c}{d} = m \quad \therefore a = b m, c = d m$$

$$\therefore \frac{3a - 2c}{3b - 2d} = \frac{3bm - 2dm}{3b - 2d} = \frac{m(3b - 2d)}{3b - 2d} = m \quad (1)$$

$$\therefore \frac{5a + 3c}{5b + 3d} = \frac{5bm + 3dm}{5b + 3d} = \frac{m(5b + 3d)}{5b + 3d} = m \quad (2)$$

$$\text{From (1) and (2) : } \therefore \frac{3a - 2c}{3b - 2d} = \frac{5a + 3c}{5b + 3d}$$

15 Form the table by yourself

$$\therefore \text{then } \sigma = \sqrt{\frac{92}{100}} \approx 1 \text{ child}$$

$$16 \therefore \frac{X}{y} = \frac{3}{5} \quad \therefore X = 3 m, y = 5 m$$

$$\therefore \frac{2X + y}{X + 3y} = \frac{6m + 5m}{3m + 15m} = \frac{11m}{18m} = \frac{11}{18}$$

19

Luxor

First Group :

$$1 \text{ c} \quad 2 \text{ d} \quad 3 \text{ c} \quad 4 \text{ b} \quad 5 \text{ c}$$

$$6 \text{ a} \quad 7 \text{ a} \quad 8 \text{ b} \quad 9 \text{ c}$$

Second Group :

$$10 (1) \therefore y \propto X^2 \quad \therefore y = m X^2$$

$$\therefore 20 = m (2)^2 \quad \therefore m = \frac{20}{4} = 5$$

$$\therefore y = 5 X^2$$

$$(2) \text{ When } X = \frac{1}{3} \quad \therefore y = 5 \times \left(\frac{1}{3}\right)^2 = \frac{5}{9}$$

$$11 \therefore \frac{X}{3} = \frac{y}{4} = \frac{z}{6} = \frac{z - 2y + 4X}{k + 5}$$

, multiplying the two terms of the 2nd ratio by (-2) , the 1st ratio by (4) and adding the antecedents and consequents of the three ratios.

$$\therefore \frac{z - 2y + 4X}{6 - 8 + 12} = \text{one of the given ratios.}$$

$$\therefore \frac{z - 2y + 4X}{10} = \frac{z - 2y + 4X}{k + 5}$$

$$\therefore 10 = k + 5$$

$$\therefore k = 10 - 5 = 5$$

$$12 \therefore \frac{a}{b} = \frac{b}{c} = \frac{c}{d} = m$$

$$\therefore c = d m, b = d m^2, a = d m^3$$

$$\therefore \frac{a}{b + d} = \frac{d m^3}{d m^2 + d} = \frac{d m^3}{d(m^2 + 1)} = \frac{m^3}{m^2 + 1} \quad (1)$$

$$\therefore \frac{c^3}{c^3 d + d^3} = \frac{d^3 m^3}{d^3 m^2 + d^3} = \frac{d^3 m^3}{d^3(m^2 + 1)} = \frac{m^3}{m^2 + 1} \quad (2)$$

$$\text{From (1) and (2) : } \therefore \frac{a}{b + d} = \frac{c^3}{c^3 d + d^3}$$

13 Let the number be : X

$$\therefore \frac{3 - X}{5 - X} = \frac{6 - X}{14 - X}$$

$$\therefore (3 - X)(14 - X) = (5 - X)(6 - X)$$

$$\therefore 42 - 17X + X^2 = 30 - 11X + X^2$$

$$\therefore 42 - 30 = -11X + 17X$$

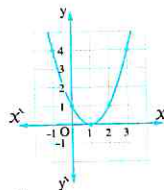
$$\therefore 12 = 6X$$

$$\therefore X = 2$$

$$\therefore \text{The number is : } 2$$

$$14 f(X) = (X - 1)^2 = X^2 - 2X + 1$$

X	-1	0	1	2	3
$f(X)$	4	1	0	1	4



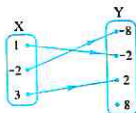
From the graph :

(1) The minimum value = 0

(2) The equation of the axis of symmetry is : $X = 1$

$$15 (1) R = \{(1, -2), (-2, -8), (3, 2)\}$$

(2) R is a function from X to Y because every element in X has only one image in Y , the range = $\{-8, -2, 2\}$



- 16 Form the table by yourself
 , then the mean ($\bar{X}$) = 16
 , $\sigma \approx 3.85$

20

North Sinai

First Group :

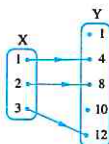
- 1 d 2 a 3 b 4 c 5 a
 6 d 7 c 8 c 9 a

Second Group :

- 10 $\therefore 5a = 4b$ $\therefore \frac{a}{b} = \frac{4}{5}$
 $\therefore a = 4m$, $b = 5m$
 $\therefore \frac{2a+b}{4a+2b} = \frac{8m+5m}{16m+10m} = \frac{13m}{26m} = \frac{1}{2}$

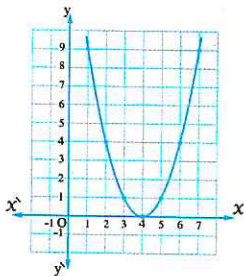
- 11 (1) $R = \{(1, 4), (2, 8), (3, 12)\}$

(2) R is a function from X to Y
 because every element in X
 has only one image in Y
 , its range = $\{4, 8, 12\}$



- 12 $f(x) = (x-4)^2 = x^2 - 8x + 16$

x	1	2	3	4	5	6	7
$f(x)$	9	4	1	0	1	4	9



From the graph :

- (1) The vertex of the curve is : $(4, 0)$
 (2) The minimum value = 0
 (3) The equation of the axis of symmetry is : $x = 4$

- 13 $\therefore b$ is the middle proportional between a and c

$$\therefore b^2 = ac$$

$$\therefore \frac{a^2+b^2}{b^2+c^2} = \frac{a^2+ac}{ac+c^2} = \frac{a(a+c)}{c(a+c)} = \frac{a}{c} \quad (1)$$

$$\therefore \frac{b^2}{c^2} = \frac{ac}{c^2} = \frac{a}{c} \quad (2)$$

$$\text{From (1) and (2) : } \therefore \frac{a^2+b^2}{b^2+c^2} = \frac{b^2}{c^2}$$

- 14 $\therefore y \propto x$

$$\therefore y = mx$$

$$\therefore 2 = 8m$$

$$\therefore m = \frac{1}{4}$$

$$\therefore y = \frac{1}{4}x$$

$$\text{When } x = 12$$

$$\therefore y = \frac{1}{4} \times 12 = 3$$

- 15 Let the number be : x

$$\therefore \frac{5+x}{11+x} = \frac{3}{5}$$

$$\therefore 25 + 5x = 33 + 3x$$

$$\therefore 5x - 3x = 33 - 25 \quad \therefore 2x = 8$$

$$\therefore x = 4$$

$\therefore$ The number is : 4

- 16 Form the table by yourself

, then the mean ($\bar{X}$) = 14
 , $\sigma \approx 3.29$

Answers of model examinations of the school book of trigonometry & geometry

Model 1

1

- 1 a 2 c 3 b
4 a 5 b 6 a

2

[a] $\therefore \sin 60^\circ = \frac{\sqrt{3}}{2}$ (1)

$\therefore 2 \sin 30^\circ \cos 30^\circ = 2 \times \frac{1}{2} \times \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2}$ (2)

From (1) and (2): $\therefore \sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$

[b] $\therefore$ The slope of $\overline{AB} = \frac{5+1}{6+3} = \frac{2}{3}$

$\therefore$ the slope of $\overline{BC} = \frac{3-5}{3-6} = \frac{2}{3}$

$\therefore$ The slope of $\overline{AB}$ = the slope of $\overline{BC}$

$\therefore \overline{AB} \parallel \overline{BC}$

$\therefore \therefore$ B is a common point between the two straight lines.

$\therefore$ The points A, B and C are collinear.

3

[a] $\therefore 4 \cos 60^\circ \sin 30^\circ = 4 \times \frac{1}{2} \times \frac{1}{2} = 1$

$\therefore \tan X = 1 \quad \therefore X = 45^\circ$

[b] Let B (X, y)

$\therefore (6, -4) = \left(\frac{X+5}{2}, \frac{y-3}{2} \right)$

$\therefore \frac{X+5}{2} = 6 \quad \therefore X+5 = 12 \quad \therefore X = 7$

$\therefore \frac{y-3}{2} = -4 \quad \therefore y-3 = -8 \quad \therefore y = -5$

$\therefore B(7, -5)$

4

[a] $\therefore m_1 = \frac{k-1}{2-3} = 1-k$

$\therefore m_2 = \tan 45^\circ = 1$

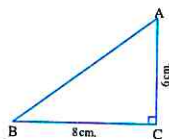
$\therefore \therefore L_1 \parallel L_2 \quad \therefore m_1 = m_2$

$\therefore 1-k = 1 \quad \therefore k = 0$

[b] $\therefore m(\angle C) = 90^\circ$

$\therefore (AB)^2 = (6)^2 + (8)^2$
 $= 100$

$\therefore AB = 10 \text{ cm.}$



[1] $\cos A \cos B - \sin A \sin B$

$= \frac{6}{10} \times \frac{8}{10} - \frac{8}{10} \times \frac{6}{10} = 0$

[2] $\therefore \cos B = \frac{8}{10} \quad \therefore m(\angle B) \approx 36^\circ 52' 12''$

5

[a] $\therefore$ The slope of the straight line = 2

$\therefore$ The equation of the straight line is:

$y = 2X + c$

$\therefore (1, 0)$ satisfies the equation.

$\therefore 0 = 2 \times 1 + c \quad \therefore c = -2$

$\therefore$ The equation of the straight line is: $y = 2X - 2$

[b] $\therefore MA = \sqrt{(-1-3)^2 + (2+1)^2} = \sqrt{16+9} = \sqrt{25}$
 $= 5 \text{ length units}$

$\therefore MB = \sqrt{(-1+4)^2 + (2-6)^2} = \sqrt{9+16}$
 $= \sqrt{25} = 5 \text{ length units}$

$\therefore MC = \sqrt{(-1-2)^2 + (2+2)^2} = \sqrt{9+16}$
 $= \sqrt{25} = 5 \text{ length units}$

$\therefore MA = MB = MC$

$\therefore A, B$ and C lie on the circle M

$\therefore$ the circumference $= 2\pi r = 2 \times \pi \times 5$
 $= 10\pi \text{ length units}$

Model 2

1

- 1 a 2 d 3 b
4 c 5 b 6 b

2

[a] $\therefore \cos E \tan 30^\circ = \cos^2 45^\circ$

$\therefore \cos E \times \frac{1}{\sqrt{3}} = \left(\frac{1}{\sqrt{2}} \right)^2$

$\therefore \cos E = \frac{\sqrt{3}}{2} \quad \therefore m(\angle E) = 30^\circ$

$$[b] \therefore AB = \sqrt{(3-1)^2 + (3-5)^2} = \sqrt{4+4} \\ = 2\sqrt{2} \text{ length units}$$

$$\therefore BC = \sqrt{(1-1)^2 + (5-3)^2} = \sqrt{4} = 2 \text{ length units}$$

$$\therefore AC = \sqrt{(3-1)^2 + (3-3)^2} = \sqrt{4} = 2 \text{ length units}$$

$$\therefore BC = AC \quad \therefore \Delta ABC \text{ is isosceles.}$$

3

$$[a] \therefore \text{The slope of the straight line} = \frac{-3-3}{-1-1} = 3$$

$$\therefore \text{The equation of the straight line is : } y = 3x + c$$

$$\therefore (1, 3) \text{ satisfies the equation.}$$

$$\therefore 3 = 3 \times 1 + c \quad \therefore c = 0$$

$$\therefore \text{The equation of the straight line is : } y = 3x$$

$$\therefore c = 0$$

$$\therefore \text{The straight line passes through the origin point.}$$

$$[b] \therefore (3, 1) = \left(\frac{1+x}{2}, \frac{y+3}{2} \right)$$

$$\therefore \frac{1+x}{2} = 3 \quad \therefore 1+x = 6$$

$$\therefore x = 5 \quad \therefore \frac{y+3}{2} = 1$$

$$\therefore y+3 = 2 \quad \therefore y = -1$$

$$\therefore (x, y) = (5, -1)$$

4

$$[a] \therefore \text{The straight line passes through the two points} \\ (1, 0) \text{ and } (0, 4)$$

$$\therefore \text{The slope} = \frac{4-0}{0-1} = -4$$

$$\therefore \text{The equation of the straight line is :} \\ y = -4x + c$$

$$\therefore \text{the intercepted part from y-axis} = 4$$

$$\therefore \text{The equation of the straight line} \\ \text{is : } y = -4x + 4$$

$$[b] \therefore m(\angle B) = 90^\circ$$

$$\therefore (AB)^2 = (10)^2 - (8)^2 = 36$$

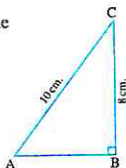
$$\therefore AB = 6 \text{ cm.}$$

$$\therefore \sin^2 A + 1 = \left(\frac{8}{10} \right)^2 + 1 = \frac{41}{25} \quad (1)$$

$$\therefore 2 \cos^2 C + \cos^2 A = 2 \times \left(\frac{8}{10} \right)^2 + \left(\frac{6}{10} \right)^2 = \frac{41}{25} \quad (2)$$

$$\text{From (1) and (2) :}$$

$$\therefore \sin^2 A + 1 = 2 \cos^2 C + \cos^2 A$$



5

$$[a] \therefore m_1 = \frac{4-3}{2+1} = \frac{1}{3}$$

$$\therefore m_2 = \frac{1}{3}$$

$$\therefore m_1 = m_2$$

$$\therefore L_1 \parallel L_2$$

$$[b] \text{ Const : Draw } \overline{DF} \perp \overline{BC}$$

$$\text{Proof : } \therefore \overline{AD} \parallel \overline{BC}, \overline{AB} \perp \overline{BC}$$

$$\therefore \overline{DF} \perp \overline{BC}$$

$$\therefore \text{ABFD is a rectangle}$$

$$\therefore BF = AD = 2 \text{ cm.}$$

$$\therefore AB = DF = 3 \text{ cm.}$$

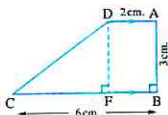
$$\therefore FC = 6 - 2 = 4 \text{ cm.}$$

$$\text{From } \Delta DFC \text{ which is right-angled at F}$$

$$\therefore (DC)^2 = (3)^2 + (4)^2 = 25$$

$$\therefore DC = 5 \text{ cm.}$$

$$\therefore \cos(\angle BCD) = \frac{4}{5}$$



Model for the merge students

1

$$[1] \checkmark$$

$$[2] \checkmark$$

$$[3] \times$$

$$[4] \times$$

$$[5] \times$$

$$[6] \checkmark$$

2

$$[1] b$$

$$[2] c$$

$$[3] d$$

$$[4] c$$

$$[5] a$$

$$[6] c$$

3

$$[1] 0$$

$$[2] 1$$

$$[3] 10$$

$$[4] 2$$

$$[5] -3$$

$$[6] \frac{\sqrt{3}}{2}$$

4

$$[1] \frac{1}{2}$$

$$[2] \frac{3}{5}$$

$$[3] 3$$

$$[4] 2$$

$$[5] 5 \text{ length units}$$

$$[6] (-5, 2)$$

Answers of governorates' examinations of trigonometry & geometry

1

Cairo

First Group :

- 1 c 2 b 3 b 4 c 5 d
6 a 7 a 8 c 9 d

Second Group :

- 10 $\therefore m_1 = \frac{5-7}{4-5} = \frac{-2}{-1} = 2$
 $m_2 = 2$ $\therefore m_1 = m_2$
 $\therefore$ The two straight lines are parallel.
- 11 $\therefore$ The slope of the straight line $= \tan 45^\circ = 1$
 $\therefore$ The equation : $y = x + c$
 at $(1, 3)$ $3 = 1 + c$ $\therefore c = 2$
 $\therefore$ Its equation : $y = x + 2$
- 12 $\therefore$ The straight line passes through the point $(2, 5)$
 $5 = 2 \times 2 + c$ $\therefore c = 5 - 4 = 1$
 $\therefore$ The straight line intercepts one unit from the positive part of the y-axis.
- 13 (1) $\therefore \Delta ABC$ is a right-angled at B
 $\therefore \sin A = \frac{1}{2}$ $\therefore m(\angle A) = 30^\circ$
- (2) L.H.S $= 1 + \cos C = 1 + \frac{1}{2} = \frac{3}{2}$
 R.H.S $= 2 \cos^2 A = 2 \times \left(\frac{\sqrt{3}}{2}\right)^2$
 $= 2 \times \frac{3}{4} = \frac{3}{2}$
 $\therefore$ L.H.S = R.H.S (2)
- 14 $\therefore AB \sqrt{(3-0)^2 + (y-0)^2} = \sqrt{9 + y^2}$
 $\therefore AB = 5$ units
 $5 = \sqrt{9 + y^2}$ "squaring the two sides"
 $25 = 9 + y^2$ $\therefore y^2 = 25 - 9 = 16$
 $\therefore y = 4$ or $y = -4$ "refused"
- 15 $\sin 30^\circ \cos 60^\circ - \tan^2 60^\circ + \cos^2 30^\circ$
 $= \frac{1}{2} \times \frac{1}{2} - \left(\sqrt{3}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2$
 $= \frac{1}{4} - 3 + \frac{3}{4} = -2$
- 16 $\therefore AB = \sqrt{(4-1)^2 + (2-1)^2}$
 $= \sqrt{9 + 1} = \sqrt{10}$ length unit.

$$\begin{aligned} BC &= \sqrt{(7-4)^2 + (3-2)^2} \\ &= \sqrt{9 + 1} = \sqrt{10} \text{ length unit.} \\ AC &= \sqrt{(7-1)^2 + (3-1)^2} \\ &= \sqrt{36 + 4} = \sqrt{40} \\ &= 2\sqrt{10} \text{ length unit.} \end{aligned}$$

$$\therefore AC = AB + BC$$

$\therefore A, B$ and C are colinear.

2

Giza

First Group :

- 1 c 2 b 3 d 4 a 5 b
6 a 7 b 8 d 9 c

Second Group :

- 10 (1) $\therefore \Delta ABC$ is a right-angled at B
 $\therefore (BC)^2 = (13)^2 - (5)^2 = 144$
 $\therefore BC = 12$ cm
- (2) $13 \cos A - 12 \tan C = 13 \times \frac{5}{13} - 12 \times \frac{5}{12} = 0$
- 11 $\therefore AB = \sqrt{(1-4)^2 + (1-3)^2}$
 $= \sqrt{9 + 4} = \sqrt{13}$ length unit.
 $BC = \sqrt{(-5-1)^2 + (-3-1)^2}$
 $= \sqrt{36 + 16} = 2\sqrt{13}$ length unit.
 $AC = \sqrt{(-5-4)^2 + (-3-3)^2}$
 $= \sqrt{81 + 36} = 3\sqrt{13}$ length unit.
 $\therefore AC = AB + BC$
 $\therefore A, B$ and C are colinear.
- 12 $\therefore C$ is the midpoint of $\overline{AB}$
 $\therefore (4, y) = \left(\frac{x+6}{2}, \frac{-3+5}{2}\right)$
 $\therefore 4 = \frac{x+6}{2}$ $\therefore 8 = x + 6$ $\therefore x = 2$
 $y = \frac{-3+5}{2}$ $\therefore y = 1$
 $\therefore x - y = 2 - 1 = 1$
- 13 $\therefore 2 \sin x = 4 \times \left(\frac{\sqrt{3}}{2}\right) - \sqrt{3} = 2\sqrt{3} - \sqrt{3} = \sqrt{3}$
 $\therefore \sin x = \frac{\sqrt{3}}{2}$
 $\therefore x = 60^\circ$

$$[14] \therefore m_1 = \frac{k-1}{5-3} = \frac{k-1}{2}, m_2 = 1$$

$\therefore$ The two straight lines are parallel.

$$\therefore m_1 = m_2 \quad \therefore \frac{k-1}{2} = 1$$

$$\therefore k-1 = 2 \quad \therefore k = 3$$

$$[15] (1) \therefore \text{The slope of the straight line} = 2$$

$\therefore$ Its equation is : $y = 2X + C$

$\therefore$ The straight line passes through the point $(-1, 3)$

$$\therefore 3 = 2 \times -1 + c$$

$$\therefore c = 5$$

$\therefore$ The equation of the straight line

$$\text{is : } y = 2X + 5$$

$$(2) \text{ Put } X = 0 \quad \therefore y = 5$$

$\therefore$ The straight line cuts the y-axis at the point $(0, 5)$

$$[16] (1) \therefore \text{The slope of } \overline{AB} = \frac{5-1}{4-0} = 1$$

$$\therefore \text{the slope of } \overline{BC} = \frac{8-5}{1-4} = -1$$

$$\therefore \text{the slope of } \overline{CD} = \frac{4-8}{-3-1} = 1$$

$$\therefore \text{the slope of } \overline{AD} = \frac{4-1}{-3-0} = -1$$

$\therefore$ The slope of $\overline{AB}$ = the slope of $\overline{CD}$

$$\therefore \overline{AB} \parallel \overline{CD}$$

$\therefore$ The slope of $\overline{BC}$ = the slope of $\overline{AD}$

$$\therefore \overline{BC} \parallel \overline{AD}$$

$\therefore$ ABCD is a parallelogram

$$\therefore \text{The slope of } \overline{AB} \times \text{the slope of } \overline{BC} = 1 \times -1 = -1$$

$$\therefore \overline{AB} \perp \overline{BC}$$

$\therefore$ ABCD is a rectangle

3

Alexandria

First Group :

$$[1] \text{ c} \quad [2] \text{ d} \quad [3] \text{ c} \quad [4] \text{ c} \quad [5] \text{ a}$$

$$[6] \text{ a} \quad [7] \text{ a} \quad [8] \text{ c} \quad [9] \text{ b}$$

Second Group :

$$[10] \therefore \tan X = 4 \times \frac{\sqrt{3}}{2} \times \frac{1}{2} = \sqrt{3}$$

$$\therefore X = 60^\circ$$

$$[11] \therefore m_1 = \frac{5+2}{4+3} = 1, m_2 = \tan 45^\circ = 1$$

$$\therefore m_1 = m_2$$

$\therefore$ The two straight lines are parallel.

$$[12] \therefore MA = \sqrt{(3+1)^2 + (-1-2)^2} = \sqrt{16+9} = \sqrt{25} = 5 \text{ length unit.}$$

$$MB = \sqrt{(-4+1)^2 + (6-2)^2} = \sqrt{9+16} = \sqrt{25} = 5 \text{ length unit.}$$

$$MC = \sqrt{(2+1)^2 + (-2-2)^2} = \sqrt{9+16} = \sqrt{25} = 5 \text{ length unit.}$$

$$\therefore MA = MB = MC$$

$\therefore$ A, B and C lies on the circle M

Which its radius length is 5 length unit.

$\therefore$ The circumference of the circle

$$= 2\pi r = 2 \times 3.14 \times 5 = 31.4 \text{ length unit.}$$

$$[13] \therefore C \text{ is the midpoint of } \overline{AB}$$

$$\therefore (X, -3) = \left(\frac{-3+9}{2}, \frac{y+11}{2} \right)$$

$$\therefore X = \frac{-3+9}{2} = \frac{6}{2} = 3$$

$$-3 = \frac{y+11}{2} \quad \therefore -6 = y+11$$

$$\therefore y = -17$$

$$\therefore X + y = 3 + (-17) = -14$$

$$[14] \therefore \text{The slope of the given straight line} = \frac{2}{3}$$

$$\therefore \text{The slope of the required straight line} = -\frac{3}{2}$$

$\therefore$ The equation of the required straight line is :

$$y = -\frac{3}{2}X + c$$

$\therefore$ The straight line passes through the point $(-2, 4)$

$$\therefore 4 = -\frac{3}{2} \times -2 + c \quad \therefore c = 1$$

$\therefore$ The equation of the required straight line is :

$$y = -\frac{3}{2}X + 1$$

$$[15] \therefore \text{The slope of } \overline{AB} = \frac{3-5}{3+2} = -\frac{2}{5}$$

$$\therefore \text{the slope of } \overline{BC} = \frac{2-3}{-4-3} = \frac{1}{7}$$

$$\therefore \text{the slope of } \overline{CD} = \frac{4-2}{-9+4} = -\frac{2}{5}$$

$$\therefore \text{the slope of } \overline{AD} = \frac{4-5}{-9+2} = \frac{1}{7}$$

$\therefore$ The slope of $\overline{AB}$ = the slope of $\overline{CD}$

$$\therefore \overline{AB} \parallel \overline{CD}$$

$\therefore$ the slope of $\overline{BC}$ = the slope of $\overline{AD}$

$$\therefore \overline{BC} \parallel \overline{AD}$$

$\therefore$ ABCD is a parallelogram.

[16] (1) In $\triangle ABC$: $\therefore m(\angle B) = 90^\circ$

$$\therefore \sin(\angle ACB) = \frac{3}{6} = \frac{1}{2}$$

$$\therefore m(\angle ACB) = 30^\circ$$

(2) $\therefore (BC)^2 = (6)^2 - (3)^2 = 27$

$$\therefore BC = 3\sqrt{3} \text{ length unit}$$

$\therefore$ The area of the rectangle

$$ABCD = 3 \times 3\sqrt{3} = 9\sqrt{3} \text{ square unit.}$$

4

El-Kalyoubia

First Group :

- [1]** a **[2]** c **[3]** b **[4]** c **[5]** a
[6] a **[7]** b **[8]** c **[9]** d

Second Group :

[10] In $\triangle ACD$:

$$\therefore m(\angle CAD) = 90^\circ, m(\angle D) = 30^\circ$$

$$\therefore AC = \frac{1}{2} DC = 3 \text{ cm.}$$

$\therefore$ In $\triangle ABC$:

$$\therefore m(\angle ACB) = 90^\circ \quad \therefore \tan B = \frac{3}{4}$$

[11] $\therefore 2 \sin X = (1)^2 \times \sqrt{3} = \sqrt{3}$

$$\therefore \sin X = \frac{\sqrt{3}}{2} \quad \therefore X = 60^\circ$$

[12] $\therefore AB = \sqrt{(3-0)^2 + (4-0)^2}$

$$= \sqrt{9+16} = \sqrt{25} = 5 \text{ length unit.}$$

$$\therefore BC = \sqrt{(-4-3)^2 + (3-4)^2} = \sqrt{49+1} = \sqrt{50} = 5\sqrt{2} \text{ length unit.}$$

$$\therefore AC = \sqrt{(-4-0)^2 + (3-0)^2} = \sqrt{16+9} = \sqrt{25} = 5 \text{ length unit.}$$

$$\therefore AB = AC$$

$\therefore \triangle ABC$ is an isosceles triangle.

[13] $\therefore$ The slope of $\overline{AB} = \frac{3-2}{2-X} = \frac{1}{2-X}$

$$\therefore \text{the slope of } \overline{CD} = \frac{2-1}{-1+4} = \frac{1}{3}$$

$$\therefore \overline{AB} \parallel \overline{CD}$$

$$\therefore \text{The slope of } \overline{AB} = \text{the slope of } \overline{CD}$$

$$\therefore \frac{1}{2-X} = \frac{1}{3}$$

$$\therefore 2-X=3$$

$$\therefore X = -1$$

[14] Let the measure of the positive angle formed by the straight line L with the positive direction of X-axis = θ

$\therefore$ The slope of the given straight line

$$= \frac{-1-5}{4+2} = -1$$

$\therefore$ The two straight lines are perpendicular

$\therefore$ The slope of the required straight line = 1

$$\therefore \tan \theta = 1$$

$$\therefore \theta = 45^\circ$$

[15] $\therefore$ The slope of the given straight line = 3

$\therefore$ The slope of the required straight line = 3

$\therefore$ The equation of the required straight line is :
 $y = 3X + c$

$\therefore$ The required straight line passes through the point (6, 2)

$$\therefore 2 = 3 \times 6 + c \quad \therefore c = -16$$

$\therefore$ The equation of the required straight line is :
 $y = 3X - 16$

[16] $\therefore c$ is the midpoint of $\overline{AB}$

$$\therefore (5, 3) = \left(\frac{6+X}{2}, \frac{y+5}{2} \right)$$

$$\therefore 5 = \frac{6+X}{2} \quad \therefore 10 = 6+X \quad \therefore X = 4$$

$$\therefore 3 = \frac{y+5}{2} \quad \therefore 6 = y+5$$

$$\therefore y = 1 \quad \therefore X+y = 4+1 = 5$$

5

El-Sharkia

First Group :

- [1]** a **[2]** c **[3]** c **[4]** d **[5]** a
[6] c **[7]** c **[8]** d **[9]** a

Second Group :

[10] $\therefore$ The slope of the given straight line = $-\frac{1}{3}$

$\therefore$ The slope of the required straight line = $-\frac{1}{3}$

∴ The equation of the required straight line is :

$$y = -\frac{1}{3}x + c$$

∴ The required straight line passes through the point (9, 6)

$$∴ 6 = -\frac{1}{3} \times 9 + c \quad ∴ c = 9$$

∴ The equation of the required straight line is :

$$y = -\frac{1}{3}x + 9$$

$$\begin{aligned} [11] \quad ∴ \tan(H+5)^\circ &= \frac{1}{2} \times \frac{1}{2} + \left(\frac{\sqrt{3}}{2}\right)^2 \times 1 \\ &= \frac{1}{4} + \frac{3}{4} = 1 \end{aligned}$$

$$∴ (H+5)^\circ = 45^\circ \quad ∴ H = 40^\circ$$

$$[12] \quad ∴ m_1 = \frac{9-5}{a-0} = \frac{4}{a}, \quad ∴ m_2 = \frac{-(a-4)}{-3} = \frac{a-4}{3}$$

$$∴ L_1 \parallel L_2 \quad ∴ m_1 = m_2$$

$$∴ \frac{4}{a} = \frac{a-4}{3} \quad ∴ a^2 - 4a = 12$$

$$∴ a^2 - 4a - 12 = 0$$

$$∴ (a-6)(a+2) = 0$$

$$∴ a = 6 \text{ or } a = -2$$

$$[13] (1) \quad ∴ \text{The slope of the straight line} = \frac{4-2}{3-1} = 1$$

∴ The equation of the straight line is

$$y = x + c$$

∴ The point B (1, 2) ∈ the straight line

$$∴ 2 = 1 + c \quad ∴ c = 1$$

∴ The equation of the straight line $\overline{AC}$ is :

$$y = x + 1$$

(2) ∴ The point of intersection of the straight line with the X-axis is A (-1, 0) and the point of intersection of the straight line with the y-axis D (0, 1)

$$\begin{aligned} ∴ \text{The area of } \triangle OAD &= \frac{1}{2} \times 1 \times 1 \\ &= \frac{1}{2} \text{ square units.} \end{aligned}$$

$$[14] \text{ Let } A(x, y)$$

∴ $\overline{AB}$ is a diameter in the circle

$$∴ (5, 7) = \left(\frac{x+8}{2}, \frac{y+11}{2}\right)$$

$$∴ 5 = \frac{x+8}{2} \quad ∴ 10 = x+8$$

$$∴ x = 2$$

$$∴ 7 = \frac{y+11}{2} \quad ∴ 14 = y+11$$

$$∴ y = 3 \quad ∴ A(2, 3)$$

$$∴ \text{The slope of } \overline{AB} = \frac{11-3}{8-2} = \frac{8}{6} = \frac{4}{3}$$

∴ The slope of the perpendicular straight line to $\overline{AB} = -\frac{3}{4}$

∴ The equation of the required straight line is :

$$y = -\frac{3}{4}x + c$$

∴ The required straight line passes through the point (2, 3)

$$∴ 3 = -\frac{3}{4} \times 2 + c \quad ∴ c = \frac{9}{2}$$

∴ The equation of the perpendicular to $\overline{AB}$ is :

$$y = -\frac{3}{4}x + \frac{9}{2}$$

$$[15] \text{ Draw } \overline{DF} \perp \overline{BC}$$

∴ $\overline{AD} \parallel \overline{BC}, \overline{AB} \perp \overline{BC}$

∴ $\overline{DF} \perp \overline{BC}$

∴ ABCD is a rectangle

∴ $BF = AD = 6 \text{ cm.}$

∴ $FC = 4 \text{ cm.}, DF = AB = 3 \text{ cm.}$

∴ From $\triangle DFC$ which is right-angled at F :

$$(DC)^2 = 3^2 + 4^2 = 25$$

$$∴ DC = 5 \text{ cm.}$$

$$∴ 2 \cos(\angle DCB) - \tan(\angle ACB)$$

$$= 2 \times \frac{4}{5} - \frac{3}{10} = \frac{8}{5} - \frac{3}{10} = \frac{16-3}{10} = \frac{13}{10}$$

$$[16] \quad ∴ 2\sqrt{5} = \sqrt{(x-6)^2 + (5-1)^2} \text{ "squaring the two sides"}$$

$$∴ 20 = (x-6)^2 + 16 \quad ∴ (x-6)^2 = 4$$

$$∴ x-6 = \pm\sqrt{4} = \pm 2$$

$$∴ x-6 = 2 \quad ∴ x = 8$$

$$\text{or } x-6 = -2 \quad ∴ x = 4$$

6

El-Monofia

First Questions :

$$[a] (1) b \quad (2) c \quad (3) c$$

$$[b] \quad ∴ C(4, y) \text{ is the midpoint of } \overline{AB}$$

$$∴ (4, y) = \left(\frac{x+6}{2}, \frac{3+5}{2}\right)$$

$$∴ 4 = \frac{x+6}{2} \quad ∴ 8 = x+6$$

$$∴ x = 2$$

$$∴ y = \frac{8}{2} \quad ∴ y = 4$$

$$∴ x+y = 2+4 = 6$$

Second Questions :

- [a] (1) b (2) c (3) d

[b] $\therefore$ The slope of $\overline{AB} = \frac{-3-1}{0-2} = \frac{-4}{-2} = 2$

$\therefore$ the slope of $\overline{BC} = \frac{3+3}{3-0} = \frac{6}{3} = 2$

$\therefore$ The slope of $\overline{AB}$ = the slope of $\overline{BC}$

$\therefore \overline{AB} \parallel \overline{BC}$

$\therefore$ B is a common point between the two straight lines $\overline{AB}$ and $\overline{BC}$

$\therefore$ A, B and C are collinear points.

Third Questions :

- [a] (1) a (2) b (3) b

[b] (1) In $\triangle ABC$ which is a right-angled at B

$\therefore (AC)^2 = 5^2 + 12^2 = 169$

$\therefore AC = 13$ cm.

$\therefore \sin A \cos C + \cos A \sin C$

$= \frac{12}{13} \times \frac{12}{13} + \frac{5}{13} \times \frac{5}{13}$

$= \frac{144}{169} + \frac{25}{169} = \frac{169}{169} = 1$

(2) $\therefore \tan C = \frac{5}{12}$

$\therefore m(\angle C) = 22^\circ 37' 12''$

Fourth Questions :

[a] $\therefore m_1 = \frac{-k}{3}$, $m_2 = \tan 45^\circ = 1$

$\therefore L_1 \parallel L_2$ $\therefore m_1 = m_2$

$\therefore \frac{-k}{3} = 1$ $\therefore k = -3$

[b] $\therefore 2 \cos E = 4 \times \left(\frac{\sqrt{3}}{2}\right)^2 - 2 \times 1$

$= 4 \times \frac{3}{4} - 2 = 1$

$\therefore \cos E = \frac{1}{2}$ $\therefore E = 60^\circ$

Fifth Questions :

[a] $AB = \sqrt{(-1-1)^2 + (2-4)^2} = \sqrt{4+4}$

$= \sqrt{8}$ length unit.

$BC = \sqrt{(2+1)^2 + (-1-2)^2} = \sqrt{9+9}$

$= \sqrt{18}$ length unit.

$AC = \sqrt{(1-2)^2 + (4+1)^2} = \sqrt{1+25}$

$= \sqrt{26}$ length unit.

$\therefore (AB)^2 + (BC)^2 = (\sqrt{8})^2 + (\sqrt{18})^2$
 $= 8 + 18 = 26$

$\therefore (AC)^2 = (\sqrt{26})^2 = 26$

$\therefore (AB)^2 + (BC)^2 = (AC)^2$

$\therefore \triangle ABC$ is a right-angled at B (First req.)

$\therefore$ the surface area of $\triangle ABC$

$= \frac{1}{2} \times AB \times BC = \frac{1}{2} \times \sqrt{8} \times \sqrt{18}$

$= 6$ square unit

(Second req.)

[b] (1) $\therefore OA = 4$ length unit

$\therefore A(0, 4)$

$\therefore OB = 4$ length unit.

$\therefore B(4, 0)$

$\therefore$ The slope of $\overline{AB} = \frac{4-0}{0-4} = -1$

(2) The equation of $\overline{AB}$ is : $y = -x + c$

$\therefore OA = 4$ length units

$\therefore c = 4$

$\therefore$ The equation of $\overline{AB}$ is : $y = -x + 4$

7

El-Gharbia

First Group :

[1] d

[2] c

[3] c

[4] d

[5] a

[6] b

[7] a

[8] d

[9] d

Second Group :

[10] Let D is the midpoint of $\overline{BC}$

$\therefore D = \left(\frac{5+3}{2}, \frac{-1+5}{2}\right) = (4, 2)$

$\therefore$ The required straight line passes through the two points : A (-3, 4), D (4, 2)

$\therefore$ Its slope $= \frac{2-4}{4+3} = \frac{-2}{7}$

$\therefore$ The equation of the required straight line is :

$y = \frac{-2}{7}x + c$

$\therefore$ The straight line passes through the point A (-3, 4)

$\therefore 4 = \frac{-2}{7} \times -3 + c$ $\therefore c = \frac{22}{7}$

$\therefore$ The equation of the required straight line is :

$y = \frac{-2}{7}x + \frac{22}{7}$

[11] $\therefore$ The slope of $\overline{XY} = \frac{2-5}{4-3} = -3$

$\therefore$ the slope of $\overline{YZ} = \frac{a-2}{-5-4} = \frac{a-2}{-9}$

$$\therefore \overline{XY} \perp \overline{YZ}$$

$$\therefore \text{The slope of } \overline{YZ} = \frac{1}{3}$$

$$\therefore \frac{a-2}{-9} = \frac{1}{3} \quad \therefore a-2 = -3$$

$$\therefore a = -1$$

$$[12] \therefore 2 \sin X = (\sqrt{3})^2 - 2 \times 1 = 3 - 2 = 1$$

$$\therefore \sin X = \frac{1}{2} \quad \therefore X = 30^\circ$$

$$[13] \therefore \text{The slope of the straight line} = \frac{1}{2}$$

$$\therefore \text{The equation of the straight line is: } y = \frac{1}{2}X + c$$

$$\therefore \text{The straight line passes through the point } (3, 4)$$

$$\therefore 4 = \frac{1}{2} \times 3 + c \quad \therefore c = \frac{5}{2}$$

$$\therefore \text{The equation of the straight line is: } y = \frac{1}{2}X + \frac{5}{2}$$

$$[14] \text{The slope of the straight line} = \tan 135^\circ = -1$$

$$\therefore \text{The equation of the straight line is: } y = -X + c$$

$$\therefore \text{The straight line passes through the point } (4, 5)$$

$$\therefore 5 = -4 + c \quad \therefore c = 9$$

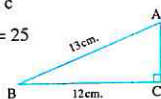
$$\therefore \text{The equation of the straight line is: } y = -X + 9$$

$$[15] (1) \therefore \triangle ABC \text{ is right-angled at } C$$

$$\therefore (AC)^2 = (13)^2 - (12)^2 = 25$$

$$\therefore AC = 5 \text{ cm.}$$

$$\therefore \sin B = \frac{5}{13}$$



$$(2) 1 + \tan^2 A = 1 + \left(\frac{12}{5}\right)^2 = 1 + \frac{144}{25} = \frac{169}{25}$$

$$[16] \therefore \text{The slope of the given straight line} = -\frac{1}{2}$$

$$\therefore \text{The slope of the required straight line} = -\frac{1}{2}$$

$$\therefore \text{The equation of the required straight line is:}$$

$$y = -\frac{1}{2}X + c$$

$$\therefore \text{The straight line passes through the point } (1, 2)$$

$$\therefore 2 = -\frac{1}{2} \times 1 + c \quad \therefore c = \frac{5}{2}$$

$$\therefore \text{The equation of the required straight line is:}$$

$$y = -\frac{1}{2}X + \frac{5}{2}$$



El-Dakahlia

First Questions :

$$[a] (1) c$$

$$(2) b$$

$$(3) d$$

$$[b] \therefore 4 \sin X = (\sqrt{3})^2 - 2 \times \frac{1}{2} = 3 - 1 = 2$$

$$\therefore \sin X = \frac{2}{4} = \frac{1}{2}$$

$$\therefore X = 30^\circ$$

Second Questions :

$$[a] (1) b$$

$$(2) a$$

$$(3) c$$

$$[b] \therefore \text{In the parallelogram the two diagonals bisect each other.}$$

$$\therefore \text{The point of intersection of the two diagonals}$$

$$= \text{the midpoint of } \overline{AC} = \left(\frac{3-4}{2}, \frac{4-3}{2}\right) = \left(-\frac{1}{2}, \frac{1}{2}\right)$$

$$\text{Let } D(x, y)$$

$$\therefore \text{The midpoint of } \overline{AC} = \text{The midpoint of } \overline{BD}$$

$$\therefore \left(-\frac{1}{2}, \frac{1}{2}\right) = \left(\frac{x+2}{2}, \frac{y-1}{2}\right)$$

$$\therefore \frac{x+2}{2} = -\frac{1}{2}$$

$$\therefore x+2 = -1$$

$$\therefore x = -3$$

$$\therefore \frac{y-1}{2} = \frac{1}{2}$$

$$\therefore y-1 = 1$$

$$\therefore y = 2$$

$$\therefore D = (-3, 2)$$

Third Questions :

$$[a] \text{ Draw } \overline{DE} \perp \overline{BC} \text{ and intersect it at } E$$

$$\therefore \triangle ABC \text{ is equilateral triangle}$$

$$\therefore m(\angle B) = 60^\circ$$

$$\therefore AB = BC = 6 + 4 = 10 \text{ cm.}$$

$$\text{In } \triangle BED :$$

$$\therefore m(\angle BED) = 90^\circ$$

$$\therefore m(\angle BDE) = 180^\circ - (90^\circ + 60^\circ) = 30^\circ$$

$$\therefore BE = \frac{1}{2} BD = 2 \text{ cm.}$$

$$\therefore (DE)^2 = (BD)^2 - (BE)^2$$

$$\therefore (DE)^2 = 4^2 - 2^2 = 12$$

$$\therefore DE = 2\sqrt{3} \text{ cm.}$$

$$\therefore CE = BC - BE = 10 - 2 = 8 \text{ cm.}$$

$$\text{In } \triangle DEC :$$

$$\therefore m(\angle DEC) = 90^\circ$$

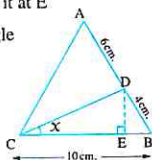
$$\therefore 1 + \tan^2 X = 1 + \left(\frac{2\sqrt{3}}{8}\right)^2 = \frac{19}{16}$$

$$[b] \text{ At } X = 0$$

$$\therefore \frac{0}{a} + \frac{y}{b} = 1$$

$$\therefore \frac{y}{b} = 1$$

$$\therefore y = b$$



∴ The straight line cuts the y-axis at the point (0, b)

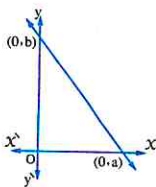
At y = 0

$$\therefore \frac{x}{a} + \frac{0}{b} = 1$$

$$\therefore \frac{x}{a} = 1$$

$$\therefore x = a$$

∴ The straight line cuts the x-axis at the point (a, 0)



∴ The area of the triangle = $\frac{1}{2} ab$

$$\therefore \frac{1}{2} ab = 12$$

$$\therefore ab = 24$$

Fourth Questions :

[a] ∴ $m_1 = \frac{k-1}{2-3} = 1-k$, $m_2 = 1$

$$\therefore L_1 \perp L_2$$

$$\therefore m_1 \times m_2 = -1$$

$$\therefore (1-k) \times 1 = -1$$

$$\therefore 1-k = -1$$

$$\therefore k = 2$$

[b] (1) ∴ $\overline{AD} \parallel \overline{XX}$

$$\therefore \overline{AB} \parallel \overline{YY}$$

$$\therefore A = (8, 9)$$

let the side length of the square = ℓ

$$\therefore \text{The point } B = (8, 9-\ell)$$

and satisfies the equation of $\overline{BO}$: $y = \frac{3}{4}x$

$$\therefore 9-\ell = \frac{3}{4} \times 8$$

$$\therefore 9-\ell = 6$$

$$\therefore 9-6 = \ell$$

$$\therefore \ell = 3 \text{ length unit.}$$

$$\therefore OX = 5 \text{ length unit}$$

$$\therefore \text{The point } D = (5, 9)$$

(2) ∴ $\overline{OD}$ passes through the origin point

$$\therefore \text{The equation of } \overline{OD} \text{ is : } y = mX$$

∴ The straight line $\overline{OD}$ passes through the two points (0, 0), (5, 9)

$$\therefore \text{Its slope} = \frac{9-0}{5-0} = \frac{9}{5}$$

∴ The equation of the straight line $\overline{OD}$ is :

$$y = \frac{9}{5}x$$

Fifth Questions :

[a] (1) b

(2) d

(3) c

[b] ∴ $AB = BC$

$$\therefore \sqrt{(x-3)^2 + (3-2)^2} = \sqrt{(3-5)^2 + (2-1)^2}$$

"Squaring the two sides"

$$\therefore (x-3)^2 + (1)^2 = (-2)^2 + (1)^2$$

$$\therefore x^2 - 6x + 9 + 1 = 5$$

$$\therefore x^2 - 6x + 5 = 0$$

$$\therefore (x-5)(x-1) = 0$$

$$\therefore x = 5 \text{ or } x = 1$$

9

Suez

First Group :

[1] c

[2] b

[3] a

[4] a

[5] c

[6] a

[7] c

[8] b

[9] d

Second Group :

[10] ∴ $2 \sin X = (\sqrt{3})^2 - 2 \times 1 = 3 - 2 = 1$

$$\therefore \sin X = \frac{1}{2}$$

$$\therefore X = 30^\circ$$

[11] ∴ $AB = \sqrt{(-2-3)^2 + (4+1)^2} = \sqrt{25+25} = \sqrt{50}$
 $= 5\sqrt{2} \text{ length unit}$

$$\therefore BC = \sqrt{(3-4)^2 + (-1-5)^2} = \sqrt{1+36}$$

$$= \sqrt{37} \text{ length unit}$$

$$\therefore AC = \sqrt{(-2-4)^2 + (4-5)^2} = \sqrt{36+1}$$

$$= \sqrt{37} \text{ length unit}$$

$$\therefore BC = AC$$

∴ $\triangle ABC$ is an isosceles triangle.

[12] ∴ The slope of the given straight line = 3

∴ The equation of the straight line is :

$$y = 3x + c$$

∴ The straight line passes through the point (1, 5)

$$\therefore 5 = 3 \times 1 + c \quad \therefore c = 2$$

∴ The equation of the straight line is :

$$y = 3x + 2$$

[13] ∴ $\triangle XYZ$ is a right-angled at Y :

$$\therefore (YZ)^2 = (5)^2 - (3)^2 = 16$$

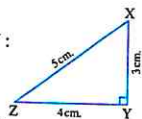
$$\therefore YZ = 4 \text{ cm.}$$

$$\therefore \tan X + \tan Z = \frac{4}{3} + \frac{3}{4} = \frac{25}{12}$$

[14] ∴ $3y - 2x = 6$

$$\therefore 3y = 2x + 6$$

$$\therefore y = \frac{2}{3}x + 2$$



∴ The slope of the straight line = $\frac{2}{3}$ and it intercepts from the positive part of y-axis 2 units.

15 Let B (X, y)

∵ C (5, 3) is the midpoint of $\overline{AB}$

$$\therefore (5, 3) = \left(\frac{4+X}{2}, \frac{-1+y}{2} \right)$$

$$\therefore 5 = \frac{4+X}{2} \quad \therefore 10 = 4 + X$$

$$\therefore X = 6$$

$$\therefore 3 = \frac{-1+y}{2} \quad \therefore 6 = -1 + y$$

$$\therefore y = 7 \quad \therefore B (6, 7)$$

16 ∵ $m_1 = \frac{4-3}{1-0} = 1$

$$\therefore m_2 = \tan 45^\circ = 1$$

$$\therefore m_1 = m_2$$

∴ The two straight lines are parallel.

10

Port Said

First Group :

- 1 c 2 a 3 b 4 c 5 d
6 b 7 c 8 b 9 b

Second Group :

10 ∵ $\cos X = (1)^2 - \left(\frac{1}{\sqrt{2}} \right)^2 = 1 - \frac{1}{2} = \frac{1}{2}$
∴ $X = 60^\circ$

11 ∵ $AB = \sqrt{(4-7)^2 + (4-0)^2}$
 $= \sqrt{25} = 5 \text{ length unit.}$

$$\therefore BC = \sqrt{(7-1)^2 + (0-0)^2}$$

$$= \sqrt{36} = 6 \text{ length unit.}$$

$$\therefore AC = \sqrt{(4-1)^2 + (4-0)^2}$$

$$= \sqrt{25} = 5 \text{ length unit.}$$

$$\therefore AB = AC$$

∴ ΔABC is an isosceles triangle.

12 ∵ The slope of the given straight

$$\text{line} = \frac{6-2}{3-1} = \frac{4}{2} = 2$$

∴ The slope of the required straight line = 2

∴ The equation of the required

straight line is : $y = 2X + C$

∵ the straight line passes through the point (0, 3)

$$\therefore 3 = 2 \times 0 + C \quad \therefore C = 3$$

∴ the equation of the required straight

line is : $y = 2X + 3$

13 ∵ ΔABC is right-angled at B

$$\therefore (AC)^2 = (3)^2 + (4)^2 = 25$$

$$\therefore AC = 5 \text{ cm.}$$

$$\therefore \sin A \sin C - \cos A \cos C$$

$$= \frac{4}{5} \times \frac{3}{5} - \frac{3}{5} \times \frac{4}{5} = \frac{12}{25} - \frac{12}{25} = \text{zero}$$

14 ∵ $m_1 = \frac{-1}{1} = -1$, $m_2 = \tan 45^\circ = 1$

$$\therefore m_1 \times m_2 = -1 \times 1 = -1$$

$$\therefore L_1 \perp L_2$$

15 ∵ C is the midpoint of $\overline{AB}$

$$\therefore (3, 2) = \left(\frac{1+X}{2}, \frac{y+3}{2} \right)$$

$$\therefore \frac{1+X}{2} = 3 \quad \therefore 1+X = 6 \quad \therefore X = 5$$

$$\therefore \frac{y+3}{2} = 2 \quad \therefore y+3 = 4 \quad \therefore y = 1$$

$$\therefore (X, y) = (5, 1)$$

16 ∵ OA = 6 length unit. ∴ A (6, 0)

∴ OB = 8 length unit. ∴ B (0, 8)

$$\therefore \text{The slope of } \overline{AB} = \frac{8-0}{0-6} = \frac{-4}{3}$$

$$\therefore \text{The equation of } \overline{AB} \text{ is : } y = \frac{-4}{3}X + C$$

∵ OB = 8 length unit ∴ C = 8

$$\therefore \text{the equation of } \overline{AB} \text{ is : } y = \frac{-4}{3}X + 8$$

11

Kafr El-Sheikh

First Group :

- 1 a 2 a 3 b 4 b 5 a
6 a 7 a 8 d 9 c

Second Group :

10 ∵ $AB = \sqrt{(1-0)^2 + (1-4)^2}$
 $= \sqrt{10} \text{ length unit.}$

$$\therefore BC = \sqrt{(0+1)^2 + (4-1)^2}$$

$$= \sqrt{10} \text{ length unit.}$$

$$\therefore AC = \sqrt{(1+1)^2 + (1-1)^2} = 2 \text{ length unit.}$$

$$\therefore AB = BC$$

∴ $\triangle ABC$ is an isosceles triangle.

$$\begin{aligned} (11) \therefore \sin X &\times \left(\frac{\sqrt{3}}{2}\right)^2 \\ &= 3 \times \left(\frac{1}{\sqrt{2}}\right)^2 \times \left(\frac{1}{\sqrt{2}}\right)^2 \times \frac{1}{2} \\ \therefore \sin X &\times \frac{3}{4} = 3 \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{3}{8} \\ \therefore \sin X &= \frac{3}{8} \times \frac{4}{3} = \frac{1}{2} \\ \therefore X &= 30^\circ \end{aligned}$$

$$(12) \therefore \text{The slope of } \overline{AC} = \frac{2 - (-2)}{3 - (-1)} = 1$$

$$\therefore \overline{AC} \perp \overline{BD}$$

$$\therefore \text{the slope of } \overline{BD} = -1$$

$$\therefore \text{the equation of } \overline{BD} \text{ is :}$$

$$y = -x + C$$

$$\therefore B(4, -3) \text{ satisfies the equation of } \overline{BD}$$

$$\therefore -3 = -4 + C \quad \therefore C = 1$$

$$\therefore \text{the equation of } \overline{BD} \text{ is : } y = -x + 1$$

$$(13) \therefore \text{The slope of the given straight}$$

$$\text{line} = \frac{-1}{-3} = \frac{1}{3}$$

$$\therefore \text{the slope of the required straight}$$

$$\text{line} = \frac{1}{3}$$

$$\therefore \text{the equation of the required straight}$$

$$\text{line is : } y = \frac{1}{3}x + C$$

∴ the straight line cuts a part of length 5 units from the negative part of y-axis.

$$\therefore c = -5$$

$$\therefore \text{the equation of the required straight}$$

$$\text{line is : } y = \frac{1}{3}x - 5$$

$$(14) \text{ Let } A(X, 0), B(0, y)$$

$$\therefore \text{the point } C(-3, 4) \text{ is the midpoint of } \overline{AB}$$

$$\therefore (-3, 4) = \left(\frac{X+0}{2}, \frac{0+y}{2}\right)$$

$$\therefore -3 = \frac{X}{2} \quad \therefore X = -6$$

$$\therefore 4 = \frac{y}{2} \quad \therefore y = 8$$

$$\therefore A(-6, 0), B(0, 8)$$

$$(15) \therefore m_1 = \frac{k-1}{2-3} = \frac{k-1}{-1} = 1 - k$$

$$\therefore m_2 = \tan 45^\circ = 1$$

$$\therefore L_1 \parallel L_2 \quad \therefore m_1 = m_2$$

$$\therefore 1 - k = 1 \quad \therefore k = 0$$

$$(16) (1) \text{ Draw } \overline{ED} \perp \overline{BC}$$

$$\therefore \overline{AD} \parallel \overline{BC}$$

$$\therefore \overline{AB} \perp \overline{BC}$$

$$\therefore \overline{DE} \perp \overline{BC}$$

$$\therefore ABEC \text{ is a rectangle.}$$

$$\therefore BE = 2 \text{ cm.}$$

$$\therefore EC = 4 \text{ cm.}, DE = 3 \text{ cm.}$$

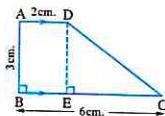
$$\therefore \text{In } \triangle DEC \text{ which is right-angled at } E$$

$$\therefore (DC)^2 = (3)^2 + (4)^2 = 25$$

$$\therefore DC = 5 \text{ cm.}$$

$$(2) \therefore \tan(\angle BCD) = \frac{DE}{EC} = \frac{3}{4}$$

$$\therefore m(\angle BCD) = 36^\circ 52' 12''$$



12

El-Beheira

First Group :

- | | | | | |
|-----|-----|-----|-----|-----|
| 1 b | 2 a | 3 d | 4 c | 5 b |
| 6 d | 7 a | 8 c | 9 a | |

Second Group :

$$(10) \therefore \sqrt{(x-6)^2 + (5-1)^2} = 2\sqrt{5} \text{ "Squaring the two sides"}$$

$$\therefore (x-6)^2 + (4)^2 = 20$$

$$\therefore (x-6)^2 = 20 - 16$$

$$\therefore (x-6)^2 = 4$$

$$\therefore x-6 = \pm 2$$

$$\therefore x-6 = -2$$

$$\therefore x = 4$$

$$\text{or } x-6 = 2$$

$$\therefore x = 8$$

$$(11) \text{ Let } A(x, 0), B(0, y)$$

$$\therefore C(4, 3) \text{ is the midpoint of } \overline{AB}$$

$$\therefore (4, 3) = \left(\frac{x+0}{2}, \frac{0+y}{2}\right)$$

$$\therefore 4 = \frac{x}{2} \quad \therefore x = 8$$

$$\therefore A(8, 0)$$

$$\therefore 3 = \frac{y}{2} \quad \therefore y = 6$$

$$\therefore B(0, 6)$$

$$\begin{aligned} \therefore AB &= \sqrt{(8-0)^2 + (0-6)^2} \\ &= \sqrt{64 + 36} = \sqrt{100} = 10 \text{ length unit.} \end{aligned}$$

$$(12) \therefore m_1 = \frac{4-3}{2+1} = \frac{1}{3}$$

$$\therefore m_2 = \frac{1}{3}, \therefore m_1 = m_2$$

∴ the two straight lines are parallel.

13 $\therefore$ The slope of the straight line $= \frac{-1+3}{1-2} = -2$

$\therefore$ the equation of the straight

line is : $y = -2X + c$

$\therefore$ the straight line passes through the point

A (2, -3)

$\therefore -3 = -2 \times 2 + C \quad \therefore C = 1$

$\therefore$ the equation of the straight line is $y = -2X + 1$

14 $\therefore$ The slope of the given straight

line $= -\frac{1}{2}$

$\therefore$ the slope of the required straight

line $= 2$

$\therefore$ the equation of the required straight line is :

$y = 2X + C$

$\therefore$ the straight line passes through the point (0, 5)

$\therefore 5 = 2 \times 0 + C \quad \therefore C = 5$

$\therefore$ the equation of the required straight line is :

$y = 2X + 5$

15 $\therefore \sin X \times \frac{1}{2} \times \sqrt{3} = 1 - \left(\frac{1}{2}\right)^2$

$\therefore \sin X \times \frac{\sqrt{3}}{2} = 1 - \frac{1}{4} = \frac{3}{4}$

$\therefore \sin X = \frac{3}{4} \times \frac{2}{\sqrt{3}} = \frac{\sqrt{3}}{2}$

$\therefore X = 60^\circ$

16 (1) $\therefore XYZ$ is right-angled at y

$\therefore (YZ)^2 = (13)^2 - (5)^2 = 144$

$\therefore YZ = 12 \text{ cm.}$

$\therefore \tan(\angle X) + \tan(\angle Z) = \frac{12}{5} + \frac{5}{12} = \frac{169}{60}$

(2) $\therefore \tan(\angle Z) = \frac{5}{12}$

$\therefore m(\angle Z) = 22^\circ 37'$

13

El-Fayoum

First Questions :

1 a

2 d

3 c

4 b

5 c

6 d

Second Questions :

[a] 1 c 2 d 3 a

[b] $\therefore \tan\left(\frac{3X}{2}\right) = 1 \quad \therefore \frac{3X}{2} = 45^\circ$

$\therefore 3X = 90^\circ \quad \therefore X = 30^\circ$

$\therefore \sin^2 X + \cos^2 X = \sin^2 30^\circ + \cos^2 30^\circ$

$= \left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{1}{4} + \frac{3}{4} = 1$

Third Questions :

[a] $\therefore \sqrt{17} = \sqrt{(2-3)^2 + (X+1)^2}$ "Squaring the two sides"

$\therefore 17 = 1 + (X+1)^2 \quad \therefore (X+1)^2 = 16$

$\therefore X+1 = \pm 4 \quad \therefore X+1 = 4 \quad \therefore X = 3$

or $X+1 = -4 \quad \therefore X = -5$

[b] $\therefore c(X, -3)$ is the midpoint of $\overline{AB}$

$\therefore (X, -3) = \left(\frac{-3+9}{2}, \frac{y+11}{2}\right)$

$\therefore X = 3 \quad \therefore -3 = \frac{y+11}{2}$

$\therefore y+11 = -6 \quad \therefore y = -17$

Fourth Questions :

[a] $\therefore m_1 = \frac{-2-4}{-3+3} = \frac{-6}{0}$ (undefined)

$\therefore$ the straight line is parallel to the y-axis

$\therefore m_2 = \frac{2-2}{-3-1} = \frac{0}{-4} = 0$

$\therefore$ the straight line is parallel to the x-axis.

$\therefore$ the two straight lines are perpendicular

[b] $\therefore$ The slope of the straight line $= \frac{-1-2}{-2-4} = \frac{1}{2}$

$\therefore$ the equation of the straight line is : $y = \frac{1}{2}X + c$

$\therefore$ the straight line passes through the point (4, 2)

$\therefore 2 = \frac{1}{2} \times 4 + c \quad \therefore c = 0$

$\therefore$ the equation of the straight line is : $y = \frac{1}{2}X$

$\therefore$ the intercepted part of y-axis is zero

$\therefore$ the straight line passes through the origin point.

Fifth Questions :

[a] $\therefore$ The slope of the given straight line $= \frac{1}{2}$

$\therefore$ the slope of the required straight line $= \frac{1}{2}$

$\therefore$ the equation of the required straight line is :

$y = \frac{1}{2}X + c$

$\therefore$ the straight line passes through the point (0, -2)

$\therefore -2 = \frac{1}{2} \times 0 + c \quad \therefore c = -2$

$\therefore$ the equation of the required straight line is :

$y = \frac{1}{2}X - 2$

[b] $\therefore$ The slope of $\overline{AB} = \frac{5-1}{4-0} = 1$

$\therefore$ the slope of $\overline{BC} = \frac{8-5}{1-4} = -1$

∴ the slope of $\overline{CD} = \frac{4-8}{-3-1} = 1$

∴ the slope of $\overline{AD} = \frac{4-1}{-3-0} = -1$

∴ the slope of $\overline{AB}$ = the slope of $\overline{CD}$

∴ $\overline{AB} \parallel \overline{CD}$

∴ the slope of $\overline{BC}$ = the slope of $\overline{AD}$

∴ $\overline{AD} \parallel \overline{BC}$

∴ ABCD is a parallelogram

∴ the slope of $\overline{AB} \times$ the slope of $\overline{BC}$

$$= 1 \times -1 = -1$$

∴ $\overline{AB} \perp \overline{BC}$

∴ ABCD is a rectangle.

$$\therefore AC = \sqrt{(0-1)^2 + (1-8)^2}$$

$$= \sqrt{1 + 49} = 5\sqrt{2} \text{ length unit.}$$

14

EL-Menia

First Group :

1 d 2 c 3 c 4 c 5 b

6 b 7 c 8 b 9 a

Second Group :

10 ∴ L.H.S. = $5 \times \left(\frac{1}{2}\right)^2 = \frac{5}{4}$

∴ R.H.S. = $9 \times \left(\frac{1}{2}\right)^2 - 1^2 = \frac{9}{4} - 1 = \frac{5}{4}$

∴ the two sides are equal.

11 ∴ The slope of $\overline{AB} = \frac{-2-4}{-1-1} = 3$

∴ the slope of $\overline{BC} = \frac{-3+2}{2+1} = -\frac{1}{3}$

∴ the slope of $\overline{AC} = \frac{-3-4}{2-1} = -7$

∴ the slope of $\overline{AB} \times$ the slope of $\overline{BC}$

$$= 3 \times -\frac{1}{3} = -1$$

∴ $\overline{AB} \perp \overline{BC}$

∴ $\triangle ABC$ is right-angled at B

12 ∴ The slope of the given straight line = $-\frac{1}{2}$

∴ the slope of the required straight line = $-\frac{1}{2}$

∴ the equation of the required straight line is :

$$y = -\frac{1}{2}x + c$$

∴ the point (3, -5) satisfies the equation

$$\therefore -5 = -\frac{1}{2} \times 3 + c \quad \therefore c = -\frac{7}{2}$$

∴ the equation of the required straight line is :

$$y = -\frac{1}{2}x - \frac{7}{2}$$

13 ∴ $\triangle ABC$ is right-angled at B

$$\therefore (AB)^2 = (13)^2 - (12)^2 = 25$$

$$\therefore AB = 5 \text{ cm.}$$

$$\therefore 1 + \tan^2 c = 1 + \left(\frac{5}{12}\right)^2 = \frac{169}{144}$$

14 ∴ $m_1 = \frac{3-7}{9+1} = -\frac{2}{5}$, $m_2 = -\frac{1}{k}$

∴ the two straight lines are perpendicular

$$\therefore m_1 \times m_2 = -1$$

$$\therefore -\frac{2}{5} \times -\frac{1}{k} = -1$$

$$\therefore \frac{2}{5k} = -1 \quad \therefore -5k = 2$$

$$\therefore k = -\frac{2}{5}$$

15 ∴ The slope of the straight line = $\tan 45^\circ = 1$

∴ the equation of the straight line is :

$$y = x + c$$

∴ the straight line passes through the point (3, 2)

$$\therefore 2 = 3 + c \quad \therefore c = -1$$

∴ the equation of the straight line is : $y = x - 1$

16 ∴ $MA = \sqrt{(-1-3)^2 + (2+1)^2} = \sqrt{16+9}$
 $= \sqrt{25} = 5 \text{ length unit.}$

∴ $MB = \sqrt{(-1+4)^2 + (2-6)^2} = \sqrt{9+16}$
 $= \sqrt{25} = 5 \text{ length unit.}$

∴ $MC = \sqrt{(-1-2)^2 + (2+2)^2} = \sqrt{9+16}$
 $= \sqrt{25} = 5 \text{ length unit.}$

$$\therefore MA = MB = CM$$

∴ A, B and C lie on the circle M

which its radius length is 5 length unit

∴ the circumference of the circle = $2\pi r$

$$= 2 \times 3.14 \times 5 = 31.4 \text{ length unit.}$$

15

Assiut

First Group :

1 c 2 b 3 a 4 b 5 c

6 a 7 b 8 c 9 c

Second Group :

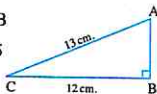
10 Let the measures of the angles

are : $3x$, $7x$ and $8x$

$$\therefore 3x + 7x + 8x = 180^\circ$$

$$\therefore 18x = 180^\circ$$

$$\therefore x = \frac{180^\circ}{18} = 10^\circ$$



- $\therefore$ the measure of the first angle $= 3 \times 10^\circ = 30^\circ$
 $\therefore$ the measure of the second angle $= 7 \times 10^\circ = 70^\circ$
 $\therefore$ the measure of the third angle $= 8 \times 10^\circ = 80^\circ$

11 In $\triangle ABC$:

$$\begin{aligned}
 \therefore m(\angle C) &= 90^\circ \\
 \therefore \sin(\angle ABC) &= \frac{AC}{AB} \\
 \therefore \sin 60^\circ &= \frac{AC}{6} \\
 \therefore AC &= 6 \sin 60^\circ = 3\sqrt{3} \text{ meter}
 \end{aligned}$$



- 12 $\therefore$ The slope of the given straight line $= \frac{5}{2}$
 $\therefore$ the slope of the required straight line $= -\frac{2}{5}$
 $\therefore$ the equation of the required straight line is :
 $y = -\frac{2}{5}x + c$
 $\therefore$ the straight line passes through the point $(3, 4)$
 $\therefore 4 = -\frac{2}{5} \times 3 + c \quad \therefore c = \frac{26}{5}$
 $\therefore$ the equation of the required straight line is :
 $y = -\frac{2}{5}x + \frac{26}{5}$

13 (1) The point of intersection of the two diagonals

$$= \left(\frac{3+1}{2}, \frac{2+2}{2} \right) = (1, 0)$$

$$\begin{aligned}
 (2) \therefore AC &= \sqrt{(-1-3)^2 + (-2-2)^2} \\
 &= \sqrt{16+16} = 4\sqrt{2} \text{ length unit.} \\
 BD &= \sqrt{(-2-4)^2 + (3+3)^2} \\
 &= \sqrt{36+36} = 6\sqrt{2} \text{ length unit.}
 \end{aligned}$$

$\therefore$ the area of the rhombus

$$ABCD = \frac{1}{2} \times 4\sqrt{2} \times 6\sqrt{2} = 24 \text{ square unit.}$$

14 at $X=0$

$$\therefore 3 \times 0 + 4y = 12$$

$$\therefore 4y = 12 \quad \therefore y = 3$$

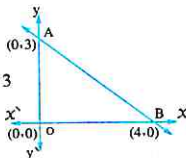
$\therefore$ the straight line cuts the X -axis at the point $(0,0)$
 $A(0, 3)$

$$\therefore \text{at } y=0 \quad \therefore 3X + 4 \times 0 = 12$$

$$\therefore 3X = 12 \quad \therefore X = 4$$

$\therefore$ the straight line cuts the y -axis at the point $B(4, 0)$

$$\begin{aligned}
 \therefore \text{the area of the triangle} &= \frac{1}{2} \times OB \times OA \\
 &= \frac{1}{2} \times 4 \times 3 \\
 &= 6 \text{ square unit.}
 \end{aligned}$$



- 15 $\therefore$ The straight line $\overline{AB}$ is parallel to y -axis.
 $\therefore$ Its slope is undefined
 $\therefore 3 - X = 0 \quad \therefore X = 3$

- 16 $\therefore$ The slope of the straight line $= 2$
 $\therefore$ the equation of the straight line is : $y = 2X + c$
 $\therefore$ the straight line passes through the point $(0, 1)$
 $\therefore 1 = 2 \times 0 + c \quad \therefore c = 1$
 $\therefore$ the equation of the straight line is : $y = 2X + 1$

16

Souhag

First Group :

- | | | | | |
|-----|-----|-----|-----|-----|
| 1 c | 2 c | 3 a | 4 d | 5 b |
| 6 c | 7 d | 8 b | 9 c | |

Second Group :

- 10 $\therefore m_1 = \frac{k-1}{2-3} = 1 - k$
 $m_2 = \tan 45^\circ = 1$
 $\therefore L_1 \parallel L_2 \quad \therefore m_1 = m_2$
 $\therefore 1 - k = 1 \quad \therefore k = 0$
- 11 $\therefore$ The slope of $\overline{AB} = \frac{5-3}{3-1} = 1$
 $\therefore$ the slope of the required straight line $= -1$
 $\therefore$ the equation of required straight line is :
 $y = -X + c$
 $\therefore$ the midpoint of $\overline{AB} = \left(\frac{1+3}{2}, \frac{3+5}{2} \right) = (2, 4)$
 $\therefore$ The required straight line passes through the midpoint of $\overline{AB}$
 $\therefore$ the point $(2, 4)$ satisfies the equation of the required straight line.
 $\therefore 4 = -2 + c \quad \therefore c = 6$
 $\therefore$ the equation of the required straight line is :
 $y = -X + 6$
- 12 $\therefore y = \frac{2}{3}x - 2$
 $\therefore$ the slope of the straight line $= \frac{2}{3}$ and the intercepted part $= 2$ units from the negative part of the y -axis.
- 13 $\therefore 2 \cos X = \frac{1}{2} \times \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2}$
 $\therefore 2 \cos X = \frac{1}{4} + \frac{3}{4}$
 $\therefore 2 \cos X = 1 \quad \therefore \cos X = \frac{1}{2}$
 $\therefore X = 60^\circ$

- 14 (1) Let A (X, 0) and B (0, y)

∴ The point C (3, 4) is the midpoint of $\overline{AB}$

$$\therefore (3, 4) = \left(\frac{X+0}{2}, \frac{0+y}{2} \right)$$

$$\therefore 3 = \frac{X}{2} \quad \therefore X = 6 \quad \therefore A (6, 0)$$

$$4 = \frac{y}{2} \quad \therefore y = 8 \quad \therefore B (0, 8)$$

$$(2) \text{ The area of } \triangle AOB = \frac{1}{2} \times AO \times BO \\ = \frac{1}{2} \times 6 \times 8 = 24 \text{ square unit.}$$

- 15 (1) ∴ $\triangle ABC$ is right-angled at B

$$\therefore (BC)^2 = (13)^2 - (5)^2 = 144$$

$$\therefore BC = 12 \text{ cm.}$$

$$\therefore \cos A \cos C - \sin A \sin C$$

$$= \frac{5}{13} \times \frac{12}{13} - \frac{12}{13} \times \frac{5}{13} = 0$$

$$(2) \therefore \cos A = \frac{5}{13}$$

$$\therefore m(\angle A) = 67^\circ 22' 48''$$

$$16 \therefore AB = \sqrt{(3+2)^2 + (-1-4)^2} = \sqrt{25+25} \\ = 5\sqrt{2} \text{ length unit.}$$

$$BC = \sqrt{(4-3)^2 + (5+1)^2} = \sqrt{1+36} \\ = \sqrt{37} \text{ length unit.}$$

$$AC = \sqrt{(4+2)^2 + (5-4)^2} = \sqrt{36+1} \\ = \sqrt{37} \text{ length unit.}$$

$$\therefore BC = AC$$

∴ $\triangle ABC$ is an isosceles triangle.

17

Aswan

First Group :

- 1 c 2 b 3 b 4 c 5 a
6 c 7 b 8 b 9 b

Second Group :

- 10 ∴ $\triangle ABC$ is right-angled at B

$$\therefore m(\angle A) + m(\angle C) = 90$$

$$\therefore m(\angle A) = 2m(\angle C)$$

$$\therefore 2m(\angle C) + m(\angle C) = 90^\circ$$

$$\therefore 3m(\angle C) = 90^\circ$$

$$\therefore m(\angle C) = \frac{90^\circ}{3} = 30^\circ$$

$$\therefore m(\angle A) = 2 \times 30^\circ = 60^\circ$$

$$\therefore \cos A + \sin C = \cos 60^\circ + \sin 30^\circ \\ = \frac{1}{2} + \frac{1}{2} = 1$$

- 11 ∴ The slope of the given straight line = -1

∴ the slope of the required straight line = -1

∴ the equation of the required straight line is :

$$y = -X + c$$

∵ the straight line passes through the point (2, 3)

$$\therefore 3 = -2 + c \quad \therefore c = 5$$

∴ the equation of the required straight line is :

$$y = -X + 5$$

- 12 Let B (X, y)

∵ M is the midpoint of $\overline{AB}$

$$\therefore M(3, -4) = \left(\frac{1+X}{2}, \frac{4+y}{2} \right)$$

$$\therefore 3 = \frac{1+X}{2} \quad \therefore 1+X = 6 \quad \therefore X = 5$$

$$\therefore -4 = \frac{4+y}{2} \quad \therefore 4+y = -8$$

$$\therefore y = -12 \quad \therefore B(5, -12)$$

- 13 $\sin 45^\circ \cos 45^\circ - \sin 30^\circ \cos 60^\circ$

$$= \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} - \frac{1}{2} \times \frac{1}{2} = \frac{1}{2} - \frac{1}{4} = \frac{1}{4}$$

- 14 ∴ The slope of $\overline{AB} = \frac{3-1}{4-1} = \frac{2}{3}$

$$\therefore \text{the slope of } \overline{BC} = \frac{-3-3}{-5-4} = \frac{2}{3}$$

∴ the slope of $\overline{AB}$ = the slope of $\overline{BC}$

$$\therefore \overline{AB} \parallel \overline{BC}$$

∴ B is a common point between the two straight lines $\overline{AB}$ and $\overline{BC}$

∴ A, B and C are collinear points

- 15 ∴ $y = 3X - 2$

∴ The slope of the straight line = 3 and the intercepted part = 2 units from the negative part of the y-axis.

$$16 \therefore m_1 = \frac{1-2}{-2+3} = -1$$

$$\therefore m_2 = \tan 45^\circ = 1$$

$$\therefore m_1 \times m_2 = -1 \times 1 = -1$$

∴ the two straight lines are perpendicular.

18

South Sinai

First Questions :

- 1 c 2 b 3 b
4 d 5 d 6 c

Second Questions :

- [a] 1 b 2 d 3 a

[b] $\therefore (0, a)$ belongs to the straight line

$$\therefore 3 \times 0 + 4 \times a = 12$$

$$\therefore 4a = 12$$

$$\therefore a = 3$$

Third Questions :

[a] $\therefore$ The slope of $\overline{AB} = \frac{-1-4}{3+2} = -1$

$$\therefore \text{the slope of } \overline{BC} = \frac{6+1}{-4-3} = -1$$

$\therefore$ the slope of $\overline{AB}$ = the slope of $\overline{BC}$

$$\therefore \overline{AB} \parallel \overline{BC}$$

$\therefore$ B is a common point between the two straight lines $\overline{AB}$ and $\overline{BC}$

$\therefore$ A, B and C are collinear.

[b] $\therefore \Delta Xyz$ is right-angled at y

$$\therefore (Xz)^2 = (12)^2 + (5)^2 = 169$$

$$\therefore Xz = 13 \text{ cm.}$$

$$\therefore \cos X \cos z + \sin X \sin z$$

$$= \frac{5}{13} \times \frac{12}{13} + \frac{12}{13} \times \frac{5}{13} = \frac{120}{169}$$

Fourth Questions :

$$[a] 2 \sin X = \frac{1}{2} \times \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2}$$

$$= \frac{1}{4} + \frac{3}{4} = 1$$

$$\therefore \sin X = \frac{1}{2} \quad \therefore X = 30^\circ$$

[b] $\therefore$ The point (4, 6) is the midpoint of $\overline{LM}$

$$\therefore (4, 6) = \left(\frac{x+5}{2}, \frac{7+y}{2} \right)$$

$$\therefore 4 = \frac{x+5}{2} \quad \therefore x+5 = 8 \quad \therefore x = 3$$

$$\therefore 6 = \frac{7+y}{2} \quad \therefore 7+y = 12 \quad \therefore y = 5$$

Fifth Questions :

[a] $\therefore$ The slope of the straight line = $\frac{3}{2}$

$\therefore$ The equation of the straight line is :

$$y = \frac{3}{2}x + c$$

$\therefore$ the straight line passes through the point $(-4, 5)$

$$\therefore 5 = \frac{3}{2} \times -4 + c \quad \therefore c = 11$$

$\therefore$ the equation of the straight line is :

$$y = \frac{3}{2}x + 11$$

[b] $\therefore$ The slope of the straight line = $\frac{5-3}{0-1} = -2$

$\therefore$ the equation of the straight line is :

$$y = -2x + c$$

$\therefore$ the straight line passes through the point $(1, 3)$

$$\therefore 3 = -2 \times 1 + c \quad \therefore c = 5$$

$\therefore$ the equation of the straight line is :

$$y = -2x + 5$$

19

Red Sea

First Group :

- 1 b 2 d 3 c 4 a 5 b
6 d 7 b 8 c 9 d

Second Group :

[10] $\therefore AB = \sqrt{(3-1)^2 + (1-1)^2} = \sqrt{4} = 2$ length unit.

$$\therefore BC = \sqrt{(1-3)^2 + (3-1)^2} = \sqrt{4+4}$$

$$= 2\sqrt{2} \text{ length unit.}$$

$$\therefore AC = \sqrt{(1-1)^2 + (3-1)^2} = \sqrt{4} = 2 \text{ length unit.}$$

$$\therefore AB = AC$$

$\therefore \Delta ABC$ is an isosceles triangle.

[11] $\therefore \sin 60^\circ = \frac{\sqrt{3}}{2}$ (1)

$$\therefore 2 \sin 30^\circ \cos 30^\circ = 2 \times \frac{1}{2} \times \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2} \quad (2)$$

From (1) and (2) :

$$\therefore \sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$$

[12] The slope of the straight line = $\frac{1+1}{1-2} = -2$

$\therefore$ the equation of the straight line is :

$$y = -2x + c$$

$\therefore$ the straight line passes through the point $(1, 1)$

$$\therefore 1 = -2 \times 1 + c \quad \therefore c = 3$$

$\therefore$ the equation of the straight line is :

$$y = -2x + 3$$

[13] $\therefore 3 \sin X = \sqrt{3} \times \frac{\sqrt{3}}{2}$

$$\therefore 3 \sin X = \frac{3}{2}$$

$$\therefore \sin X = \frac{1}{2} \quad \therefore X = 30^\circ$$

[14] $\therefore$ The point c is the midpoint of $\overline{AB}$

$$\therefore (X, -3) = \left(\frac{-3+9}{2}, \frac{y+0}{2} \right) = \left(3, \frac{y}{2} \right)$$

$$\therefore X = 3, -3 = \frac{y}{2} \quad \therefore y = -6$$

$$15 \therefore m_1 = -1$$

$$, m_2 = \tan 45^\circ = 1$$

$$, \therefore m_1 \times m_2 = -1 \times 1 = -1$$

$\therefore$ the two straight lines are perpendicular.

16 The equation of the straight line is :

$$y = 4x + 3$$

at $y = 0$

$$\therefore x = \frac{-3}{4}$$

$\therefore$ the point of intersection with the x -axis is :

$$\left(\frac{-3}{4}, 0\right)$$

20

Matrouh

First Group :

1 d

2 d

3 a

4 b

5 a

6 a

7 b

8 b

9 a

Second Group :

10 $\therefore$ The slope of the straight line = 2

$\therefore$ the equation of the straight line is :

$$y = 2x + c$$

$\therefore$ the straight line passes through the point (1, 5)

$$\therefore 5 = 2 \times 1 + c$$

$$\therefore c = 3$$

$\therefore$ the equation of the straight line is :

$$y = 2x + 3$$

$$11 \therefore m_1 = \frac{5-2}{6-3} = 1, m_2 = -1$$

$$, \therefore m_1 \times m_2 = 1 \times -1 = -1$$

$\therefore$ the two straight lines are perpendicular.

12 Let B (x, y)

$\therefore$ c is the midpoint of $\overline{AB}$

$$\therefore (3, 4) = \left(\frac{1+x}{2}, \frac{2+y}{2}\right)$$

$$\therefore 3 = \frac{1+x}{2}$$

$$\therefore 1+x=6$$

$$\therefore x=5$$

$$, 4 = \frac{2+y}{2}$$

$$\therefore 2+y=8$$

$$\therefore y=6$$

$$\therefore B(5, 6)$$

$$13 \therefore \sin^2 30^\circ + \cos^2 30^\circ = \left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2$$

$$= \frac{1}{4} + \frac{3}{4} = 1 \quad (1)$$

$$, \tan 45^\circ = 1 \quad (2)$$

From (1) and (2) :

$$\therefore \sin^2 30^\circ + \cos^2 30^\circ = \tan 45^\circ$$

$$14 \overline{AB} = \sqrt{(-4-2)^2 + (-3-5)^2}$$

$$= \sqrt{36+64} = 10 \text{ length unit.}$$

15 Let D be the midpoint of $\overline{BC}$

$$\therefore D = \left(\frac{5+3}{2}, \frac{-1+5}{2}\right) = (4, 2)$$

$\therefore$ the required straight line passes through the two points A (-3, 4), D (4, 2)

$\therefore$ the slope of the required straight line

$$= \frac{2-4}{4+3} = -\frac{2}{7}$$

$\therefore$ the equation of the required straight line is :

$$y = -\frac{2}{7}x + c$$

$\therefore$ the required straight line passes through the point A (-3, 4)

$$\therefore 4 = -\frac{2}{7} \times -3 + c \quad \therefore c = \frac{22}{7}$$

$\therefore$ the equation of the required straight line is :

$$y = -\frac{2}{7}x + \frac{22}{7}$$

16 $\therefore \Delta ABC$ is right-angled at c

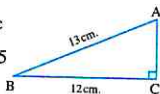
$$\therefore (AC)^2 = (13)^2 - (12)^2 = 25$$

$$\therefore AC = 5 \text{ cm.}$$

$$\therefore \text{L.H.S.} = \sin A \cos B + \cos A \sin B$$

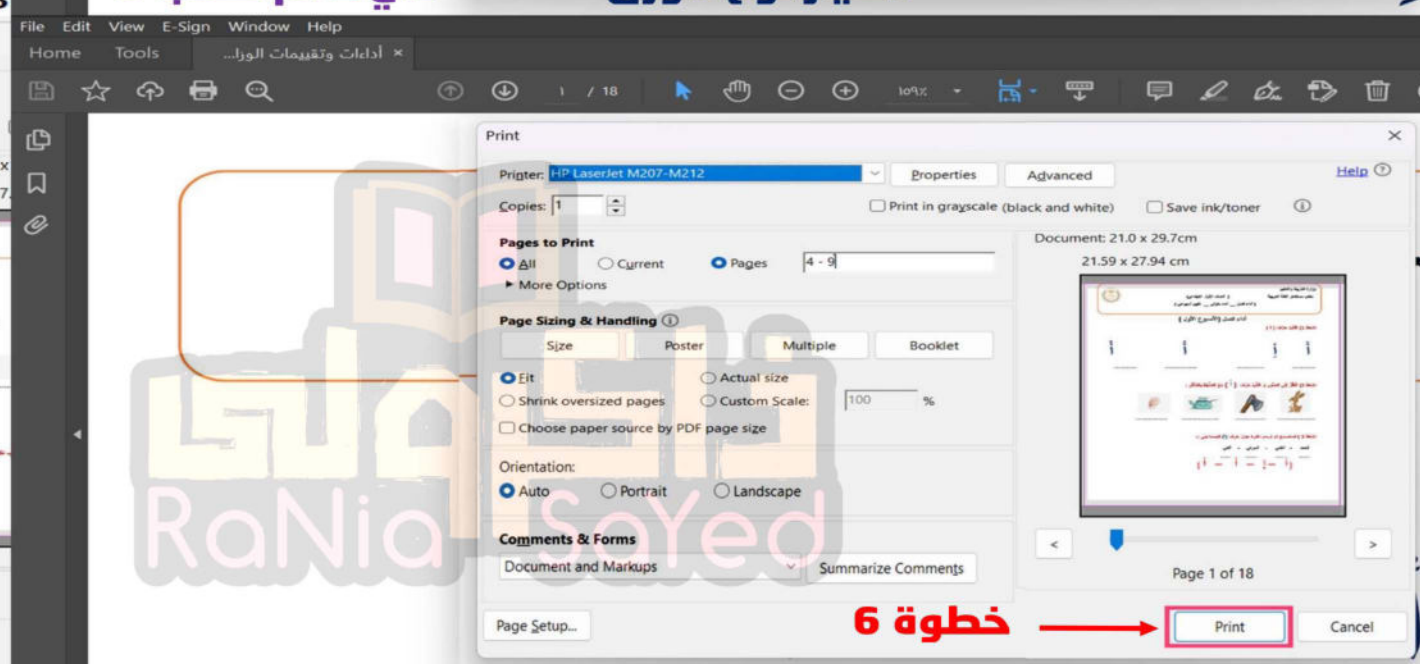
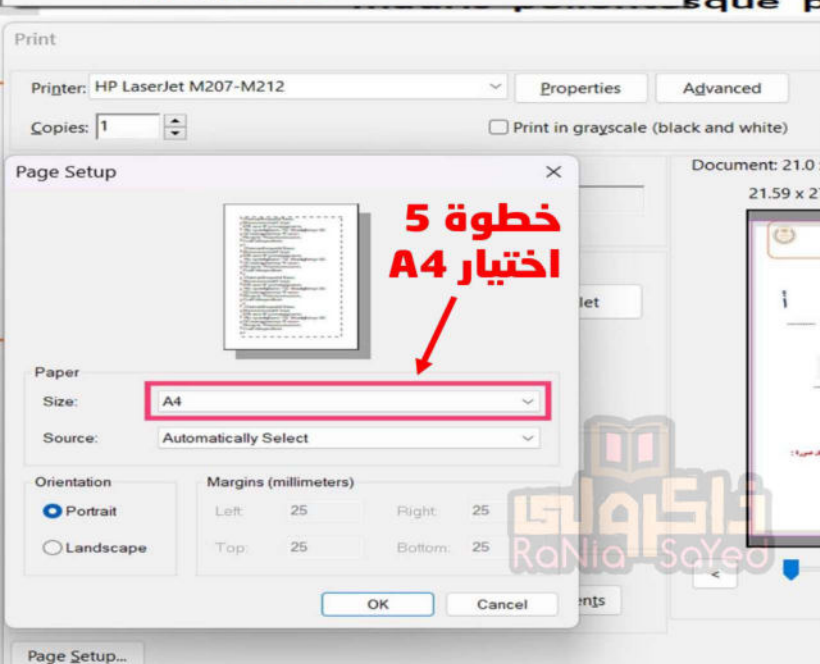
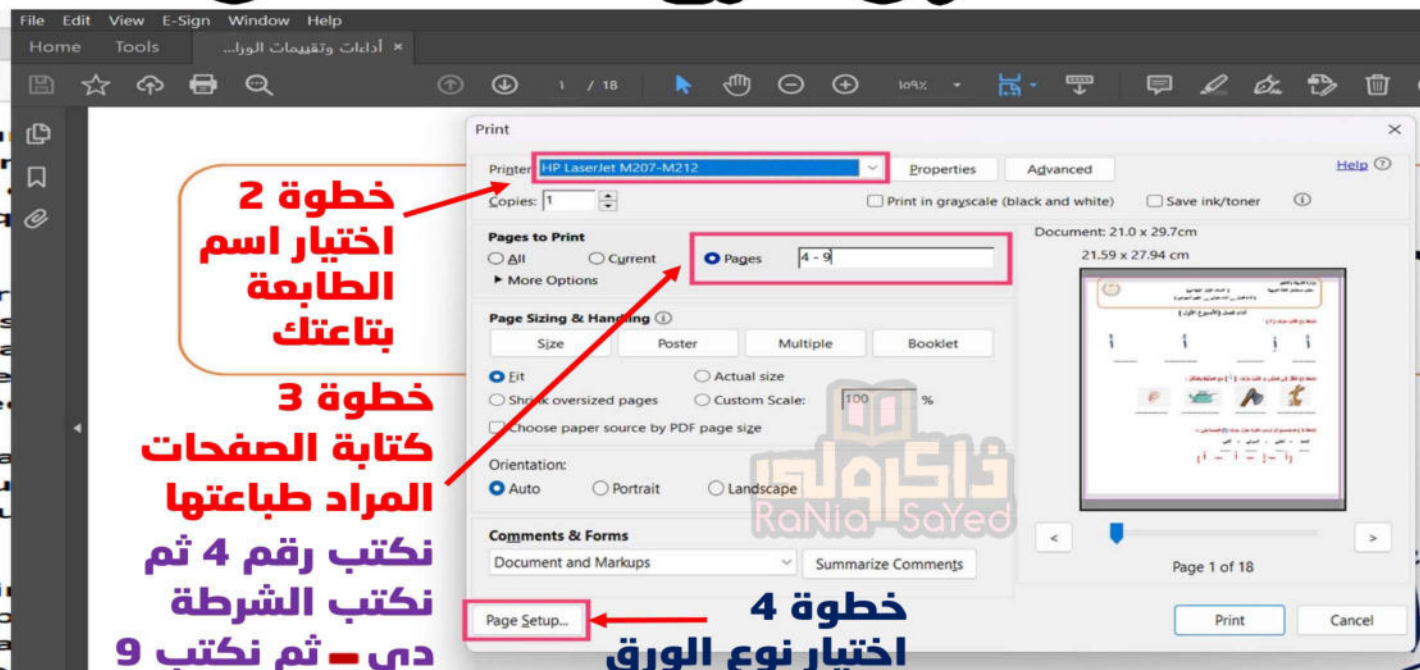
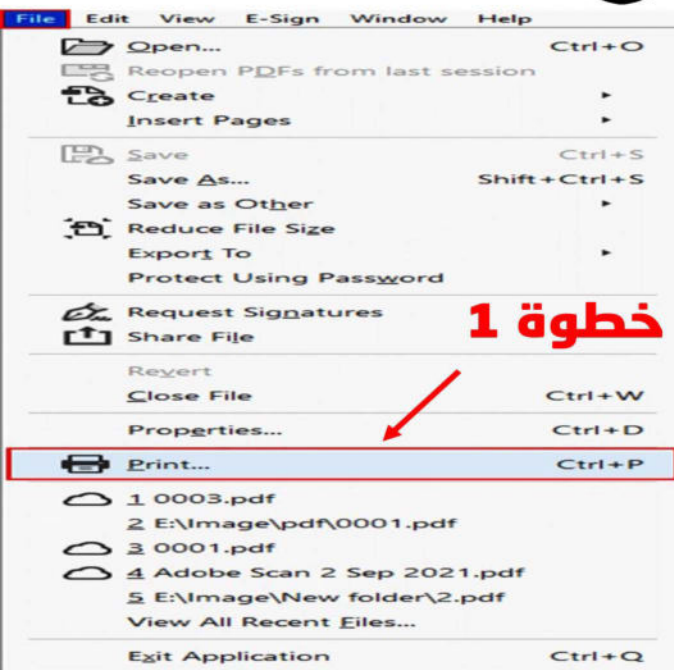
$$= \frac{12}{13} \times \frac{12}{13} + \frac{5}{13} \times \frac{5}{13}$$

$$= \frac{144}{169} + \frac{25}{169} = 1 = \text{R.H.S.}$$



كيفية طباعة صفحات معينة من ملف معين

مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



حمل الآن

مجاناً وحصرياً

امتحانات رقم (2)

الترم الاول





1

Cairo Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 If $2^x = 8$, then $x^2 = \dots\dots\dots$

- (a) 2 (b) 3 (c) 4 (d) 9

2 The degree of the algebraic term $4x^2y^3$ is $\dots\dots\dots$

- (a) second. (b) third. (c) fourth. (d) fifth.

3 If the point $(k - 2, 4)$ lies on the y-axis , then $k = \dots\dots\dots$

- (a) 2 (b) 4 (c) 6 (d) 8

4 The middle proportional of the two quantities a, c is $\dots\dots\dots$

- (a) $\pm ac$ (b) $\pm\sqrt{ac}$ (c) $\frac{a+c}{2}$ (d) $\frac{1}{2}ac$

5 The difference between the greatest value and the smallest value for a set of values is called the $\dots\dots\dots$

- (a) range. (b) median.
(c) arithmetic mean. (d) standard deviation.

6 $\mathbb{R} - \mathbb{Q} = \dots\dots\dots$

- (a) $\mathbb{Z}$ (b) $\mathbb{Q}$ (c) $\emptyset$ (d) $\mathbb{R}^+$

2 [a] Find the number which if added to each of the two terms of the ratio $5 : 11$, it becomes $4 : 7$

[b] If $X = \{1, 2, 3\}$ and $Y = \{2, 3, 4, 5\}$ and R is a relation from X to Y where " aRb " means " $a + b = 5$ " for each $a \in X, b \in Y$

- 1 Write R and represent it by an arrow diagram.
2 Show that R is a function.

3 [a] Find the fourth proportional of the quantities : $3, 5, 6$

[b] If $X \times Y = \{(2, 1), (2, 4), (2, 5)\}$, find :

- 1 Y 2 $Y \times X$ 3 $n(Y^2)$

4 [a] If y varies inversely as x and $y = 4$ when $x = 3$

- 1 Write the relation between y and x 2 Find the value of y when $x = 6$

[b] If $\frac{x}{2} = \frac{y}{3} = \frac{z}{5}$, prove that : $\frac{2x+y}{7} = \frac{2y+z}{11}$

- 5 [a]** Graph the curve of the function $f : f(x) = (x - 3)^2$, where $x \in [1, 5]$, from the graph find :

- 1** The equation of the axis of symmetry of the curve.
2 The minimum value of the function.

- [b]** Calculate the standard deviation for the values : 6 , 4 , 5 , 3 , 7

2

Giza Governorate



Answer the following questions :

- 1 Choose the correct answer :**

- 1** If $2^x = 1$, then $x = \dots\dots\dots$
 (a) zero (b) 1 (c) 2 (d) 3
- 2** If $\sqrt{x} = 3$, then $x = \dots\dots\dots$
 (a) 3 (b) 6 (c) 9 (d) $\sqrt{3}$
- 3** $\{2\} \times \{5\} = \dots\dots\dots$
 (a) $\{10\}$ (b) $\{7\}$ (c) $\{52\}$ (d) $\{(2, 5)\}$
- 4** If $xy = 5$, then $y \propto \dots\dots\dots$
 (a) $\frac{1}{x}$ (b) x (c) $x + 5$ (d) $\frac{x}{5}$
- 5** If $\frac{a}{2} = \frac{b}{5} = \frac{2a+b}{k}$, then $k = \dots\dots\dots$
 (a) 3 (b) 4 (c) 7 (d) 9
- 6** The range of the set of the values : 7 , 3 , 6 , 5 and 9 is $\dots\dots\dots$
 (a) 3 (b) 9 (c) 6 (d) 12

- 2 [a]** If $\frac{x}{3} = \frac{y}{4} = \frac{c}{5}$, then find the value of : $\frac{2x+3y}{7c-2y}$

- [b]** If $X = \{1, 2, 3, 4\}$, $Y = \{1, 8, 9, 27, 64\}$ and R is a relation from X to Y where " aRb " means " $a^3 = b$ " for each $a \in X$ and $b \in Y$, then :

- 1** Write R and represent it by an arrow diagram.
2 Is R a function ? and if the relation is a function, then find its range.

- 3 [a]** If $y \propto x$ and $y = 6$ when $x = 2$, then find :

- 1** The relation between y and x **2** The value of y when $x = 5$

- [b]** If b is the middle proportional between a and c

, then prove that : $\frac{a-b}{a-c} = \frac{b}{b+c}$

4 [a] If $(2x - 1, x + y) = (5, 8)$, then find the value of y

[b] If $\frac{x - 2y}{x + 3y} = \frac{3}{5}$, then find the value of $x : y$

5 [a] Find the arithmetic mean and the standard deviation of the values :

2, 4, 6, 8

[b] Represent graphically the function $f : f(x) = x^2 - 4x + 3$, taking $x \in [0, 4]$, and from the graph find :

- 1 The minimum value of the function.
- 2 The equation of the axis of symmetry of the function.

3

Alexandria Governorate



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

1 The range of the set of values : 7, 3, 6, 9 and 5 equals

- (a) 3 (b) 6 (c) 9 (d) 12

2 If $a + 3b = 7$, $c = 3$, then the numerical value of the expression : $a + 3(b + c) = \dots\dots\dots$

- (a) 10 (b) 16 (c) 21 (d) 30

3 $2^x + 2^x = \dots\dots\dots$

- (a) 4^x (b) 2^{2x} (c) 2^{2x+1} (d) 2^{x+1}

4 If $(x + 5, 8) = (1, 6y + x)$, then $x + y = \dots\dots\dots$

- (a) 8 (b) -2 (c) -4 (d) 6

5 If $x - y = 5$, $x + y = 2$, then $x^2 - y^2 = \dots\dots\dots$

- (a) 10 (b) 3 (c) 2 (d) 5

6 The third proportional of the two numbers 3, 6 is

- (a) $\frac{1}{2}$ (b) 9 (c) 2 (d) 12

2 [a] If $X = \{0, 1, 2, 3\}$, $Y = \{0, 1, 2, 3, 4, 5, 6\}$ and R is a relation from X to Y where " aRb " means " $a = \frac{1}{2}b$ " for all $a \in X, b \in Y$

- 1 Write R and represent it by an arrow diagram.
- 2 Show that R is a function, and why?

[b] If $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$, prove that : $\frac{2y - z}{3x - 2y + z} = \frac{1}{2}$

3 [a] If $f(x) = x^2 - 3x$, $g(x) = x - 3$, **find** : $f(\sqrt{2}) + 3g(\sqrt{2})$

[b] Find the positive number which if its square is added to each of the two terms of the ratio 5 : 11 , it becomes 3 : 5

4 [a] Represent graphically the function $f : f(x) = -x^2 - 2x$ where $x \in [-4, 2]$, **from the graph deduce** :

- 1** The coordinates of the vertex point of the curve.
- 2** The equation of the axis of symmetry.
- 3** The maximum value of the function.

[b] If a , b , c and d are continued proportional quantities , **prove that** : $\frac{a^2 - 3c^2}{b^2 - 3d^2} = \frac{b}{d}$

5 [a] If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 2$, **find** :

- 1** The relation between y and x
- 2** The value of y when $x = 1.5$

[b] Calculate the standard deviation for the values : 13 , 14 , 17 , 19 , 22 (rounding the result to three decimal place).

4

El-Kalyoubia Governorate



Answer the following questions :

1 Choose the correct answer from the given ones :

1 If $X = \{2\}$, $Y = \{3, 4\}$, then $n(X^2) \times n(Y) = \dots\dots\dots$

- (a) 1 (b) 2 (c) 3 (d) 4

2 If $2^{x-4} = \frac{1}{16}$, then $x = \dots\dots\dots$

- (a) 0 (b) $\frac{1}{4}$ (c) $\frac{1}{3}$ (d) $\frac{1}{2}$

3 The middle proportional between the two numbers 3 and 12 is $\dots\dots\dots$

- (a) ± 3 (b) ± 4 (c) ± 6 (d) ± 12

4 The solution set of the equation : $x - 1 = |-1|$ in $\mathbb{N}$ is $\dots\dots\dots$

- (a) $\{0\}$ (b) $\{1\}$ (c) $\{2\}$ (d) $\emptyset$

5 If $-1 < x < 3$, $x \in \mathbb{R}$, then $(x + 1) \in \dots\dots\dots$

- (a) $\{0, 3\}$ (b) $[-1, 3[$ (c) $\{0, 4\}$ (d) $]0, 4[$

6 The positive square root of the average of squares of deviations of the values from mean is called the

- (a) range. (b) arithmetic mean.
(c) standard deviation. (d) mode.

2 [a] If $X = \{2, -1\}$, $Y = \{-1, 5\}$, $Z = \{2, 3\}$
 , find : **1** $X \times Y$ **2** $(X - Y) \times Z$

[b] If $y \propto X$ and $y = 5$ when $X = 15$, find :

- 1** The relation between X and y **2** The value of y when $X = 30$

3 [a] If $X = \{-4, -2, 0, 2, 4\}$ and R is a relation on X where " aRb " means " a is the additive inverse of b " where $a \in X$, $b \in X$, write R and represent it by an arrow diagram and show if R is a function or not.

[b] If $\frac{a}{b} = \frac{c}{d}$, prove that : $\frac{a+b}{c+d} = \frac{b}{d}$

4 [a] Find the number that if added to each of the two terms of the ratio $7 : 11$, then it becomes $4 : 5$

[b] If $2, a, b, 54$ are in continued proportion, find the value of : $a + b$

5 [a] Graph the function $f : f(X) = X^2 + 2X - 3$, taking $X \in [-4, 2]$, then find :

- 1** The minimum value of the function.
2 The equation of the axis of symmetry.

[b] Calculate the arithmetic mean and the standard deviation of the values :
 $12, 13, 16, 18, 21$

5

El-Sharkia Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 If $Xy = 3$, then $X \propto$

- (a) y (b) $\frac{1}{y}$ (c) y^2 (d) $\frac{1}{y^2}$

2 If the point $(k - 2, 3k - 2)$ is at a distance of 4 length units from X -axis, then $k =$

- (a) 0 (b) 1 (c) 2 (d) 3

Algebra and Statistics

3 If $a : b = 2 : 3$, $b : c = 5 : 6$, then $a : c = \dots\dots\dots$

- (a) 1 : 3 (b) 3 : 5 (c) 2 : 3 (d) 5 : 9

4 If the standard deviation for some values = 3 and the number of these values = 2 , then $\sum (X - \bar{X})^2 = \dots\dots\dots$

- (a) 1 (b) 18 (c) 12 (d) 24

5 The result of $\frac{3^{2X} + 3^{2X} + 3^{2X}}{3^X \times 3^X}$ in the simplest form is $\dots\dots\dots$

- (a) $3^4 X$ (b) $3^2 X$ (c) 3 (d) $\frac{1}{3}$

6 If the straight line which represents the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(X) = 2X + 3 + c$ passes through the origin point , then $c = \dots\dots\dots$

- (a) -2 (b) -3 (c) 0 (d) 3

2 [a] If $\frac{a}{3} = \frac{b}{2} = \frac{c}{5}$, prove that : $\frac{a - 2b + 3c}{2a + b + c} = \frac{14}{13}$

[b] If $(X - Y) \times Y = \{(1, 2), (1, 3)\}$, $n(X \times Y) = 6$
 , find : 1 X, Y 2 $(X \cap Y) \times Y$

3 [a] If $y = a + 2$, $a \propto X$, write the relation between a and X when $X = 2$ and $a = 4$, then find y at $X = 1$

[b] If $X = \{a : a \in \mathbb{Z}, -2 \leq a \leq 2\}$ and R is a relation on X where " aRb " means " a is the additive inverse of b " for all $a \in X, b \in X$, write R and represent it by an arrow diagram , and show if R is a function or not , give reason.

4 [a] If a, b, c and d are in continued proportion

, prove that : $\frac{a^2 - 3c^2}{b^2 - 3d^2} = \frac{b}{d}$

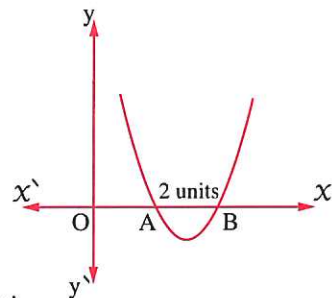
[b] In the opposite figure :

f is a quadratic function

where $f(X) = X^2 - 6X + m$

, the length of $AB = 2$ unit length.

find the value of m , then find the minimum value of the function.



5 [a] Find the number which if added to each of the numbers 3 , 5 , 8 , 12 , it will make them proportional.

[b] Calculate the mean and the standard deviation for the values : 12 , 13 , 16 , 18 , 21



Answer the following questions :

1 Choose the correct answer from the given ones :

- 1** If $(2^x, \sqrt{y}) = (1, 1)$, then $x - y = \dots\dots\dots$
 (a) zero (b) 1 (c) - 1 (d) ± 1
- 2** If $X = \{1, 3\}$, then $n(X^2) = \dots\dots\dots$
 (a) 2 (b) 4 (c) 3 (d) 10
- 3** If $f(x) = 1$, then $f(1) + f(2) = \dots\dots\dots$
 (a) 1 (b) 2 (c) 3 (d) 4
- 4** $]-1, 3] \cap \{-3, -1\} = \dots\dots\dots$
 (a) $\emptyset$ (b) $\{-3\}$ (c) $\{-1\}$ (d) $\{3\}$
- 5** If $xy = 3$, then $y \propto \dots\dots\dots$
 (a) x^{-1} (b) x (c) $3x$ (d) x^2
- 6** Half the number $4^{20} = \dots\dots\dots$
 (a) 2^{20} (b) 2^{29} (c) 2^{19} (d) 2^{39}

- 2 [a]** If $X = \{1, 2, 3\}$, $Y = \{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{5}\}$ and R is a relation from X to Y where " aRb " means " a is the multiplicative inverse of b " for each $a \in X$, $b \in Y$, write R and represent it by an arrow diagram , show if R is a function or not , and why ?

- [b]** If b is the middle proportional between a and c , **prove that :** $\frac{a^2}{b^2} + \frac{b^2}{c^2} = \frac{2a}{c}$

- 3 [a]** If y varies inversely as x , and $y = 10$ when $x = 3$, find the relation between y and x , then find also y when $x = 5$

- [b]** Represent graphically the function $f : f(x) = (x - 2)^2$, $x \in [0, 4]$, **from the graph deduce :**

- 1** The coordinates of the vertex point of the curve.
2 The equation of the axis of symmetry.

- 4 [a]** Find the number which if we add it to each term of the ratio $3 : 7$, it becomes $1 : 2$

- [b]** If $X \times Y = \{(1, 1), (1, 3), (1, 5)\}$, **find :** **1** X, Y **2** $Y \times X$ **3** X^2

5 [a] If $5a = 3b$, then find : $(7a + 9b) : (4a + 2b)$

[b] Calculate the mean and the standard deviation for the data : 4 , 8 , 12 , 10 , 6
(rounding the result to one decimal place).

7**El-Dakahlia Governorate**

Answer the following questions : (Calculator is permitted)

1 [a] Choose the correct answer :

[1] The range of the set of values : 23 , 22 , 15 , 18 , 17 is

(a) 8 (b) 18 (c) 19 (d) 23

[2] If $f(x) = 2x - 1$, $g(x) = 4$, then $f(g(x)) = \dots\dots\dots$

(a) 7 (b) 4 (c) -4 (d) -7

[3] If $X = \{a, a^3\}$, then a may be equal to

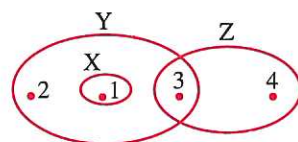
(a) -1 (b) zero (c) 1 (d) 2

[b] In the opposite figure :

By using Venn diagram which represents the sets X , Y and Z

, find : **[1]** $(X \cap Y) \times Z$

[2] $(X \cup Y) \times (Z - Y)$



2 [a] Choose the correct answer :

[1] If 10 grams of chocolate give 300 calories, then the number of calories which are found in 30 grams of the same chocolate equals

(a) 90 (b) 100 (c) 900 (d) 9000

[2] The ratio between the circumference of the circle : the length of its diameter =

(a) $\pi : 1$ (b) $1 : \pi$ (c) $2\pi : 1$ (d) $1 : 2\pi$

[3] If $\frac{a}{b} = \frac{3}{5}$, $5a - 2b = 20$, then $b = \dots\dots\dots$

(a) 3 (b) 5 (c) 15 (d) 20

[b] If b is the middle proportional between a and c

, prove that : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

3 [a] Find the standard deviation for the values : 5 , 6 , 7 , 8 , 9

[b] If $X = \{-1, 0, 1\}$ and R is a relation on X where " aRb " means " $b = a^2$ " for each $a \in X, b \in X$, write R and show with reason if R is a function or not, and if R is a function, mention its range.

4 [a] If $\frac{x+y}{9} = \frac{y+z}{7}$, prove that : $\frac{x-z}{x+2y+z} = \frac{1}{8}$

[b] A car moves with uniform velocity where the distance varies directly with the time. If the car covered a distance of 150 km. in 6 hours, find the distance covered by that car in 10 hours.

5 [a] If $x^4 y^2 - 14x^2 y + 49 = 0$, prove that : y varies inversely with x^2

[b] In the opposite figure :

The curve represents

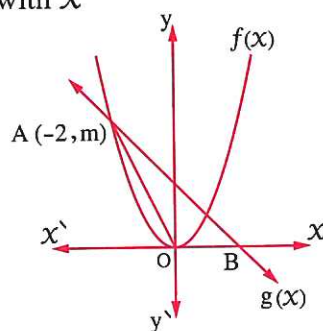
the quadratic function $f : f(x) = x^2$

, $\overleftrightarrow{AB}$ represents the linear function $g : g(x) = k - x$

If $A(-2, m)$

, find : **1** The values of k, m

2 The area of $\triangle AOB$



8 Kafr El-Sheikh Governorate



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from the given ones :

1 The multiplicative inverse of 2 is

(a) -2

(b) $-\frac{1}{2}$

(c) $\frac{1}{2}$

(d) 2

2 If $n(X) = 5$, $n(X \times Y) = 10$, then $n(Y) = \dots\dots\dots$

(a) 2

(b) 3

(c) 4

(d) 5

3 The degree of the algebraic term $3x^2y^2$ is degree.

(a) the second

(b) the third

(c) the fourth

(d) the fifth

4 If $xy = 5$, then $y \propto \dots\dots\dots$

(a) x

(b) $\frac{1}{x}$

(c) $5x$

(d) $\frac{1}{5}x$

5 Half of the number 4^{10} is

(a) 2^5

(b) 2^{10}

(c) 2^{19}

(d) 4^5

Algebra and Statistics

6 is one of the measures of the dispersions.

- (a) The arithmetic mean (b) The median
(c) The mode (d) The range

2 [a] If $X = \{1, 3, 4, 5\}$, $Y = \{1, 2, 3, 4, 5, 6\}$ and R is a relation from X to Y where " aRb " means " $a + b = 7$ " for all $a \in X$, $b \in Y$

1 Write R and represent it by an arrow diagram.

2 Show if R is a function or not, and why?

[b] If $\frac{a}{b} = \frac{3}{5}$, find the value of: $\frac{4a + 2b}{7a + 9b}$

3 [a] If a, b, c and d are proportional, prove that: $\frac{a-b}{c-d} = \frac{a}{c}$

[b] If $y \propto X$ and $y = 10$ when $X = 5$, find:

- 1 The relation between X and y
2 The value of y when $X = 3$

4 [a] Calculate the arithmetic mean and the standard deviation for the values: 15, 9, 7, 6, 3

[b] If $f(X) = 2X + c$ and $f(1) = 7$

- 1 Find the value of c 2 Find the value of $f(2)$

5 [a] If b is the middle proportional between a and c , prove that: $\frac{b^2 + c^2}{a^2 + b^2} = \frac{c}{a}$

[b] Represent graphically the function $f: f(X) = X^2 - 4$, where $X \in [-3, 3]$, from the graph deduce the vertex of the curve.

9

El-Beheira Governorate



Answer the following questions: (Calculator is permitted)

1 Choose the correct answer from the given ones:

1 If $n(X) = 3$, $n(X \times Y) = 12$, then $n(Y) = \dots\dots\dots$

- (a) 9 (b) 4 (c) 15 (d) 36

2 If $3a - 4b = 0$, then $\frac{a}{b} = \dots\dots\dots$

- (a) $\frac{3}{4}$ (b) $\frac{-3}{4}$ (c) $\frac{4}{3}$ (d) $\frac{-4}{3}$

3 The range of the set of the values: 7, 3, 6, 9 and 5 equals $\dots\dots\dots$

- (a) 3 (b) 4 (c) 6 (d) 5

- 4** The solution set of the equation : $(X - 1)^2 = 9$ in $\mathbb{R}$ is
- (a) $\{4\}$ (b) $\{-2\}$ (c) $\{4, -2\}$ (d) $\{3\}$
- 5** If $\frac{y}{x} = 5$ where $x \neq \text{zero}$, then $y \propto$
- (a) x (b) $x - 5$ (c) $x + 5$ (d) $\frac{1}{x}$
- 6** If $x^3 = 27$, $\sqrt{y} = 3$, then $x + y =$
- (a) 6 (b) 9 (c) 30 (d) 12
-
- 2** [a] Find the positive number which if we add its square to each of the terms of the ratio 5 : 7 , it becomes 7 : 8
- [b] If $X = \{2, 3, 4\}$, $Y = \{6, 9, 12, 15\}$ and R is a relation from X to Y where " aRb " means " $3a = b$ " for each $a \in X$, $b \in Y$, write R and represent it by an arrow diagram , show that R is a function from X to Y
-
- 3** [a] If $y \propto x$ and $y = 6$ when $x = 3$, find the relation between y and x , the value of y when $x = 5$
- [b] If $\frac{x}{2} = \frac{y}{5} = \frac{z}{7}$, **prove that** : $\frac{5y - 3z}{2z - 3x} = \frac{1}{2}$
-
- 4** [a] If $X = \{3, 4\}$, $Y = \{4, 5\}$, $Z = \{5, 6, 7\}$, **find** :
- (1) $X \times (Y \cap Z)$ (2) $(X - Y) \times Z$ (3) $n(Z^2)$
- [b] If b is the middle proportional between a and c , **prove that** : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$
-
- 5** [a] **Calculate the standard deviation for the following values** : 16 , 32 , 5 , 20 , 27
- [b] Represent graphically the function $f : f(x) = (x - 2)^2$, where $x \in [-1, 5]$, **from the graph find** :
- (1) The vertex of the curve.
- (2) The minimum value of the function and the equation of the axis of symmetry.

10

El-Menia Governorate



Answer the following questions : (Calculator is allowed)

- 1** Choose the correct answer from the given ones :

- (1) If m represents a negative number , which of the following represents a positive number ?
- (a) m^3 (b) m^2 (c) $2m$ (d) $\frac{m}{2}$

- 2 is one of the measures of the dispersions.
- (a) The median (b) The arithmetic mean
(c) The standard deviation (d) The mode
- 3 If the total cost of a trip is (y) , some of it is constant (a) and the other is directly proportional with the number of participants (X) , then (m is a constant $\neq 0$)
- (a) $y = a X$ (b) $y = \frac{a}{X}$ (c) $y = a + \frac{m}{X}$ (d) $y = a + m X$
- 4 If $2^X = \frac{1}{8}$, then $X =$
- (a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) 3 (d) -3
- 5 If $X - y = 5$, $X + y = \frac{1}{5}$, then $X^2 - y^2 =$
- (a) $\frac{1}{25}$ (b) 1 (c) 25 (d) 5
- 6 If the point $(X - 4 , 2 - X)$ is located in the third quadrant , where $X \in \mathbb{Z}$, then $X =$
- (a) 2 (b) 3 (c) 4 (d) 6

- 2 [a] If $X = \{1, 2, 3\}$, $Y = \{1, 3, 6, 9, 12\}$ and R is a relation from X to Y where "aRb" means " $a = \frac{1}{3} b$ " for each $a \in X$, $b \in Y$
- 1 Write R and represent it by an arrow diagram.
2 Is R a function ? And why ?
- [b] If $y \propto X$ and $y = 14$ when $X = 42$, find :
- 1 The relation between y and X 2 The value of y when $X = 60$

- 3 [a] If the straight line which represents the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(X) = 4X + a$ intersects the X-axis at the point $(2, b)$, find the value of each of : a , b
- [b] Calculate the standard deviation of the values : 8 , 9 , 7 , 6 and 5

- 4 [a] If b is the middle proportional between a and c

, prove that : $\left(\frac{b-c}{a-b}\right)^2 = \frac{c}{a}$

[b] If $X^4 y^2 - 14 X^2 y + 49 = 0$, prove that : $y \propto \frac{1}{X^2}$

- 5 [a] If $a : b = 3 : 5$, find the ratio : $20a - 7b : 15a + b$

- [b] Represent the function $f : f(X) = X^2 - 2$ graphically taking $X \in [-3, 3]$, and from the graph , deduce the coordinates of the vertex of the curve and the maximum or minimum value of the function.

11**Souhag Governorate**

Answer the following questions : (Calculator is allowed)

1 Choose the correct answer :

- 1** If $|X| - 4 = 3$, then $X = \dots\dots\dots$
 (a) 7 (b) -7 (c) ± 7 (d) 1
- 2** If $f(X) = 3$, then $f(5) + f(-5) = \dots\dots\dots$
 (a) 6 (b) 1 (c) zero (d) -1
- 3** $\sqrt[3]{125} + \sqrt[3]{\dots\dots\dots} = \sqrt{64}$
 (a) 8 (b) 3 (c) 9 (d) 27
- 4** If $XY = 5$, then y changes inversely with $\dots\dots\dots$
 (a) $\frac{1}{X}$ (b) X (c) $5X$ (d) $\frac{X}{5}$
- 5** If $X^2 + y^2 = 25$, $XY = 12$, then $(X - y)^2 = \dots\dots\dots$
 (a) 1 (b) 5 (c) 13 (d) 37
- 6** If all the individuals are equal in value, then $\dots\dots\dots$
 (a) $\bar{X} - X > 0$ (b) $\bar{X} - X < 0$ (c) $\sigma = 0$ (d) $\bar{X} = 0$

2 [a] If $X = \{3\}$, $Y = \{4, 5\}$, $Z = \{6, 5\}$, find :

- 1** $(X \cap Y) \times Z$ **2** $X \times (Y - Z)$ **3** $n(X^2)$

[b] If $\frac{X-3y}{X+2y} = \frac{2}{3}$, find the value of : $\frac{X}{y}$

3 [a] If a, b, c and d are proportional quantities, prove that : $\frac{3a-2c}{5a+3c} = \frac{3b-2d}{5b+3d}$

[b] If $X = \{0, 1, 2, \frac{1}{2}\}$ and R is a relation on X where " aRb " means " a is the multiplicative inverse of b " for all $a \in X, b \in X$

- 1** Write R as a set of ordered pairs, then represent it by an arrow diagram.
2 Show that R is a function or not? Why?

4 [a] If $a, 2, 4, b$ are in continued proportion, find : $a + b$

[b] Represent the function $f : f(X) = (X + 1)^2$ where $X \in [-4, 2]$ and from the graph deduce :

- 1** The coordinates of the vertex of the curve.
2 The maximum or the minimum value of the function.
3 The equation of the axis of symmetry.

5 [a] If $y \propto X$ and $y = 20$ when $X = 4$, find :

- 1** The relation between y and X
- 2** The value of X when $y = 40$

[b] The following table represents the frequency distribution of the ages of 10 children :

Ages in years	5	8	9	10	12	Total
No. of children	1	2	3	3	1	10

Calculate the standard deviation to ages in years.

12

Qena Governorate



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

- 1** If X, Y are two sets non empty and $n(X) = 2$, $n(Y^2) = 9$, then $n(X \times Y) = \dots\dots\dots$
 - (a) 3
 - (b) 4
 - (c) 6
 - (d) 18
- 2** $[-2, 3] - \{-2, 5\} = \dots\dots\dots$
 - (a) $[-2, 3[$
 - (b) $]-2, 3[$
 - (c) $]-2, 5[$
 - (d) $]-2, 3]$
- 3** If $y \propto X$ and $X = 3$ when $y = 2$, then the constant proportional equals $\dots\dots\dots$
 - (a) 2
 - (b) 3
 - (c) $\frac{2}{3}$
 - (d) 6
- 4** $(\sqrt{3} - 1)^2 = \dots\dots\dots$
 - (a) $4 - 2\sqrt{3}$
 - (b) $\sqrt{2}$
 - (c) 2
 - (d) $2\sqrt{3} + 1$
- 5** If the standard deviation for the values : $X + 1, y, 4$ equals zero, then $Xy = \dots\dots\dots$
 - (a) 4
 - (b) 12
 - (c) 16
 - (d) 20
- 6** The sum of all real numbers in the interval $]-2, 2]$ equals $\dots\dots\dots$
 - (a) 2
 - (b) -2
 - (c) zero
 - (d) can not sum

2 [a] If $X = \{-2, -1, 0, 1, 2, 3\}$ and R is a relation on X where " aRb " means " a is the additive inverse of b " for each $a \in X, b \in X$, write R and show it by an arrow diagram.

Is R a function or not ? And if it is a function, find its range.

[b] If b is the middle proportional between a, c , then prove that : $\frac{a^3 + b^3}{b^3 + c^3} = \frac{a^2}{bc}$

3 [a] If the straight line showing the function $f : f(X) = 2X - b$ intersects X -axis at the point $(1, a - 3)$, then find the values of : a, b

[b] If a, b, c and d are proportional quantities, prove that : $\frac{a+b}{b} = \frac{c+d}{d}$

- 4 [a] If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 2$, then find the relation between x and y , then find the value of y when $x = 1.5$

[b] Find the mean and the standard deviation for the following values : 3 , 6 , 4 , 7 , 5

- 5 [a] If $\frac{x}{y} = \frac{2}{3}$, then find the value of : $\frac{3x + 2y}{6y - x}$

[b] Represent graphically the function $f : f(x) = 3 - x^2$. Let $x \in [-2, 2]$, from the graph find the vertex of the curve, the maximum or minimum value of the function and the equation of the axis of symmetry.

13

Aswan Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

[1] If $2x = y = 5$, then $y \propto$

- (a) $\frac{1}{x}$ (b) $x - 5$ (c) x (d) $x + 5$

[2] $2^3 \times 2^5 =$

- (a) 2^{15} (b) 2^2 (c) 4^8 (d) 2^8

[3] The range of the set of values : 7 , 3 , 6 , 5 and 9 equals

- (a) 3 (b) 5 (c) 6 (d) 7

[4] $\frac{1}{2} + \frac{1}{4} =$ %

- (a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{3}{4}$ (d) 75

[5] If $(3, b - 1)$ lies on x -axis, then $b =$

- (a) 3 (b) -3 (c) -1 (d) 1

[6] $[2, 5] \cup \{2\} =$

- (a) $]2, 5[$ (b) $[2, 5]$ (c) $\{2\}$ (d) $]2, 5]$

- 2 [a] If $X = \{2, 3, 4\}$, $Y = \{2, 3, 4, 5, 6, 7, 8\}$ and R is a relation from X to Y where " aRb " means " $a = \frac{1}{2}b$ " for each $a \in X, b \in Y$

[1] Write R and represent it by an arrow diagram.

[2] Show that R is a function from X to Y and find its range.

[b] If $y \propto \frac{1}{x}$ and $y = 6$ when $x = 2$, find :

[1] The relation between x and y

[2] The value of y when $x = 3$

- 3 [a]** Represent graphically the quadratic function f where $f(x) = x^2 + 2x + 1$, taking $x \in [-4, 2]$ and from the graph deduce the coordinates of the vertex of the curve, the maximum or minimum value of the function and the equation of the symmetry axis.

[b] If b is the middle proportional between a and c

, prove that : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

- 4 [a]** If $f(x) = x^2 - 3x$, $g(x) = x - 3$, prove that : $f(3) = g(3)$

[b] If $\frac{a}{b} = \frac{3}{5}$, then find the value of : $\frac{7a + 9b}{4a + 2b}$

- 5 [a]** If $X = \{1\}$, $Y = \{2, 3\}$, $Z = \{2, 5, 6\}$

, find : **1** $n(Y^2)$

2 $X \times (Y \cap Z)$

[b] Calculate the mean and the standard deviation for the following values :
12, 13, 16, 18, 21

14

South Sinai Governorate



Answer the following questions :

- 1** Choose the correct answer from those given :

1 The solution set of the equation : $x^2 + 9 = 0$ in $\mathbb{R}$ is

(a) $\emptyset$

(b) $\{3\}$

(c) $\{-3\}$

(d) $\{-3, 3\}$

2 $\sqrt[3]{4 - \sqrt[3]{64}} = \dots\dots\dots$

(a) -4

(b) -2

(c) 2

(d) 4

3 If $(a, b + 1) = (5, -9)$, then $a + b = \dots\dots\dots$

(a) 15

(b) 10

(c) 9

(d) -5

4 If $x = 5y$, then $x \propto \dots\dots\dots$

(a) y

(b) $\frac{1}{y}$

(c) $\frac{5}{y}$

(d) $\frac{y}{5}$

5 The range for the values : 7, 15, 25, 19 equals

(a) 15

(b) 18

(c) 19

(d) 25

6 If $X = \{1, 3, 4\}$, $Y = \{5, 7\}$, then $n(X \times Y) = \dots\dots\dots$

(a) zero

(b) 2

(c) 3

(d) 6

- 2 [a]** If $X = \{-1, 2\}$, $Y = \{3, 2\}$, $Z = \{4, 6, 8\}$, find : $(X - Y) \times Z$

[b] If $y^2 - 10xy + 25x^2 = 0$, prove that : $y \propto x$

- 3 [a]** Find the number which if its square is added to each of the two terms of the ratio 7 : 11 , it becomes 4 : 5
- [b]** If $X = \{1, 2, 3\}$, $Y = \{-1, -2, -3\}$ and R is a relation from X to Y where " aRb " means " a is the additive inverse of b " for all $a \in X$, $b \in Y$, write R as a set of ordered pairs , showing if it is a function or not and represent it by an arrow diagram.

- 4 [a]** If y varies inversely as X and $X = 3$ at $y = 2$, find the relation between X and y , then find the value of X when $y = 6$

- [b]** The following table shows the marks of 20 students in an algebraic exam :

The marks	0	1	2	3	4	5	Total
Frequency	1	3	5	6	3	2	20

Calculate the standard deviation for these marks.

- 5 [a]** Represent graphically the function $f : f(X) = X^2 - 4$, $X \in [-3, 3]$ and from the graph deduce the vertex of the curve and the equation of the axis of symmetry.

- [b]** If a , b , c and d are in continued proportion

, prove that :
$$\frac{a^2 - 3c^2}{b^2 - 3d^2} = \frac{b}{d}$$

15

Matrouh Governorate



Answer the following questions : (Calculator is allowed)

- 1** Choose the correct answer from the given ones :

- [1]** The range of the set of values : 7 , 3 , 6 , 9 and 5 is

(a) 3 (b) 4 (c) 6 (d) 12

- [2]** If $X = \{3\}$, then $X^2 = \dots\dots\dots$

(a) $\{9\}$ (b) 9 (c) $\{(3, 3)\}$ (d) $\{3, 3\}$

- [3]** The algebraic term $4abc$ is of the degree.

(a) first (b) third (c) fourth (d) seventh

- [4]** If the straight line representing the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(X) = 4X - 5$ passes through the point $(a, 3)$, then $a = \dots\dots\dots$

(a) -3 (b) -2 (c) 2 (d) 4

- [5]** The fourth proportional of the quantities 3 , 6 and 6 is

(a) 3 (b) 6 (c) 9 (d) 12

6 $\sqrt{25} = \dots\dots\dots$

(a) -5

(b) $|5|$

(c) ± 5

(d) 625

- 2 [a] If $X = \{2, 4, 6\}$, $Y = \{1, 2, 3, 5\}$ and R is a relation from X to Y where " aRb " means " $a = 2b$ " for each $a \in X$, $b \in Y$

1 Write R and represent R by an arrow diagram.

2 Is R a function from X to Y or not? Why? And find the range.

[b] If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - 2b + 5c}{3x}$, then find the value of : x

- 3 [a] If $X \times Y = \{(1, 2), (4, 2), (5, 2)\}$
 , find : 1 X 2 $Y \times X$ 3 $n(X^2)$

[b] If b is the middle proportional between a and c , prove that : $\frac{a^2}{b^2} + \frac{b^2}{c^2} = \frac{2a}{c}$

- 4 [a] Calculate the arithmetic mean and the standard deviation of the following data :
 6, 8, 10, 12 and 14

[b] If y varies inversely as x and $y = 3$ when $x = 2$

, find : 1 The relation between y and x

2 The value of y when $x = 6$

- 5 [a] If $(a - 3, 7) = (2, b^3 - 1)$

, find : $\frac{a + 2b}{2a - b}$

[b] Graph the curve of the function $f : f(x) = 1 - x^2$, where $x \in [-2, 2]$
 and from the graph find :

1 The coordinates of the vertex of the curve.

2 The maximum or minimum value of the function.

3 The equation of the symmetry axis.



Examinations on Port Said Specifications



on Algebra and Statistics

Exam

1

Port Said 2023

First Multiple choice questions

Choose the correct answer from those given :

1 $\sqrt{50} - \sqrt{8} = \dots\dots\dots$

(a) $\sqrt{42}$

(b) $\sqrt{58}$

(c) $3\sqrt{2}$

(d) $2\sqrt{5}$

2 If $X = \{2\}$, then $X^2 = \dots\dots\dots$

(a) 4

(b) $\{4\}$

(c) (2 , 2)

(d) $\{(2 , 2)\}$

3 $f : f(X) = X^4 - 2X^3 + 7$ is a polynomial function of the degree.

(a) first

(b) second

(c) third

(d) fourth

4 If 3 , 6 and X are proportional quantities , then $X = \dots\dots\dots$

(a) 9

(b) 12

(c) 15

(d) 18

5 The range of the set of values 7 , 3 , 6 , 9 , 5 is
(a) 3 (b) 4 (c) 6 (d) 12

6 If $\frac{X}{5} = \frac{y}{4} = \frac{X+2y}{k}$, then $k = \dots\dots\dots$

(a) 8

(b) 9

(c) 13

(d) 14

7 The relation which represents direct variation between y and X is
(a) $XY = 5$ (b) $y = X^2 + 3$ (c) $\frac{X}{3} = \frac{4}{y}$ (d) $\frac{X}{5} = \frac{y}{3}$

8 If $(1 , 2) \in \{(1 , X) , (3 , 4)\}$, then $X = \dots\dots\dots$

(a) 1

(b) 2

(c) 3

(d) 4

9 $f(X) = 5$ is represented by a straight line that is parallel to X -axis and passes through the point
(a) (0 , 5) (b) (5 , 0) (c) (5 , -5) (d) (0 , 0)

10 If $y \propto X$ and $X = 1$ when $y = 4$, then the variation constant =
(a) 4 (b) 3 (c) 2 (d) 1

Algebra and Statistics

11 If $\frac{a}{b} = \frac{2}{3}$, then $3a - 2b = \dots\dots\dots$

- (a) 3 (b) 2 (c) 1 (d) zero

12 If $Xy = 5$, then y varies inversely as $\dots\dots\dots$

- (a) x (b) $\frac{1}{x}$ (c) $\frac{5}{x}$ (d) $5 + x$

13 If $\frac{a}{b} = \frac{b}{c} = 2$, then $\frac{a}{c} = \dots\dots\dots$

- (a) 2 (b) 4 (c) 6 (d) 8

14 The S.S. of the equation : $x^2 + 9 = 0$ where $x \in \mathbb{R}$ is $\dots\dots\dots$

- (a) $\{-3\}$ (b) $\{3\}$ (c) $\{-3, 3\}$ (d) $\emptyset$

15 If $X \times Y = \{(1, 2), (3, 2)\}$, then $Y = \dots\dots\dots$

- (a) $\{1, 2\}$ (b) $\{3, 2\}$ (c) $\{2\}$ (d) $\{1, 3\}$

16 If $f(x) = x + b$, $f(3) = 7$, then $b = \dots\dots\dots$

- (a) 10 (b) 7 (c) 4 (d) 3

17 If $y \propto x$, $y \propto \frac{1}{z}$, then $y \propto \dots\dots\dots$

- (a) $\frac{x}{z}$ (b) $\frac{z}{x}$ (c) xz (d) $x + z$

18 The point $(-2, -3)$ lies in the $\dots\dots\dots$ quadrant.

- (a) first (b) second (c) third (d) fourth

19 If $n(X) = 3$, $n(X \times Y) = 6$, then $n(Y) = \dots\dots\dots$

- (a) 2 (b) 3 (c) 6 (d) 9

20 If $\frac{a}{b} = \frac{c}{d} = \frac{3}{5}$, then $\frac{a+c}{b+d} = \dots\dots\dots$

- (a) $\frac{5}{3}$ (b) $\frac{3}{5}$ (c) $\frac{6}{5}$ (d) $\frac{5}{6}$

21 If $a, b, 2, 3$ are proportional quantities, then $\frac{b}{a} = \dots\dots\dots$

- (a) $\frac{3}{2}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) $\frac{1}{2}$

Second Essay questions

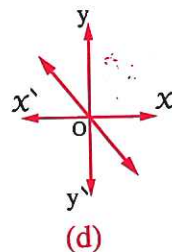
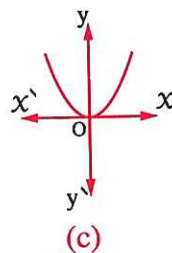
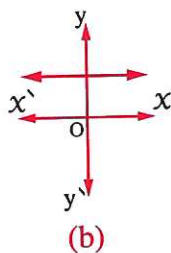
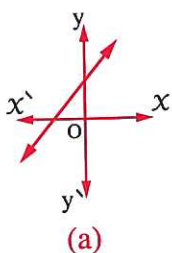
- 22** Draw the curve of the function $f : f(x) = x^2 - 1$ where $x \in [-2, 2]$
 and from the graph, find : **1** The minimum value of the function.
2 The equation of the symmetry axis of the curve.
-
- 23** If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 4$, find the value of y when $x = 6$
-
- 24** Calculate the standard deviation of the values : 1, 3, 5, 7, 9

Exam 2 Port Said 2024

First Multiple choice questions

Choose the correct answer from those given :

- 1** If $x - y = 3$, $x + y = 7$, then $x^2 - y^2 = \dots\dots\dots$
 (a) 4 (b) 10 (c) 14 (d) 21
-
- 2** If X, Y are two non empty sets and $n(X) = n(X \times Y)$, then $n(Y) = \dots\dots\dots$
 (a) 3 (b) 2 (c) 1 (d) zero
-
- 3** If $3a = 5b$, then $a : b = \dots\dots\dots$
 (a) 3 : 5 (b) 5 : 3 (c) 8 : 5 (d) 5 : 8
-
- 4** If $\frac{a}{b} = \frac{b}{c} = \frac{c}{3} = 2$, then $a = \dots\dots\dots$
 (a) 3 (b) 6 (c) 12 (d) 24
-
- 5** If $\{2\} \times \{x, y\} = \{(2, 4), (2, 3)\}$, then $x - y = \dots\dots\dots$
 (a) 1 (b) -1 (c) ± 1 (d) zero
-
- 6** The line that represents the function $f : f(x) = x + 1$ cuts y -axis at the point $\dots\dots\dots$
 (a) (1, 0) (b) (0, 1) (c) (-1, 0) (d) (0, -1)
-
- 7** Which of the following graphs represents a direct variation between x and y ?



Algebra and Statistics

- 8 The sum of the two square roots of the number $2\frac{1}{4}$ is
(a) $1\frac{1}{2}$ (b) $\frac{1}{2}$ (c) zero (d) 1
-
- 9 $f : f(x) = 3$ is a polynomial function of the degree.
(a) third (b) second (c) first (d) zero
-
- 10 The middle proportional between the two numbers 3, 27 is
(a) 9 (b) -9 (c) ± 9 (d) 81
-
- 11 If $x - 2y = 0$, then $x \propto$
(a) y (b) $\frac{1}{y}$ (c) $\frac{2}{y}$ (d) $\frac{y}{2}$
-
- 12 The third proportional for the numbers 3, 5, ..., 15 is
(a) 10 (b) 9 (c) 8 (d) 6
-
- 13 If $X = \{3, 5, 7\}$ and R is a relation on X, then the relation which represents a function is
(a) $R = \{(3, 5), (5, 3), (3, 7)\}$ (b) $R = \{(3, 5), (5, 5), (7, 5)\}$
(c) $R = \{(3, 5), (5, 7)\}$ (d) $R = \{(3, 3), (3, 5), (3, 7)\}$
-
- 14 The dispersion for the values : 3, 3, 3, 3 is
(a) zero (b) 1 (c) 3 (d) 6
-
- 15 If $b < 2$, then the point $(b - 2, 4)$ lies in the quadrant.
(a) first (b) second (c) third (d) fourth
-
- 16 If $\frac{a}{b} = \frac{7}{5}$, then $\frac{a+b}{a-b} =$
(a) 3 (b) 4 (c) 5 (d) 6
-
- 17 If $y \propto \frac{1}{x}$ and $x = 1$ when $y = 4$, then the relation between y and x is
(a) $xy = 1$ (b) $\frac{x}{y} = 4$ (c) $\frac{y}{x} = 4$ (d) $xy = 4$
-
- 18 If $f(x) = x^3$, then $f(2) + f(-2) =$
(a) 8 (b) 4 (c) -8 (d) zero

19 If $\frac{a}{b} = \frac{c}{d} = 5$, then $\frac{2a-3c}{2b-3d} = \dots\dots\dots$

- (a) 10 (b) 15 (c) 5 (d) 1

20 If $(3, b) \in f(x) = 2x - 1$, then $b = \dots\dots\dots$

- (a) 4 (b) 5 (c) 6 (d) 7

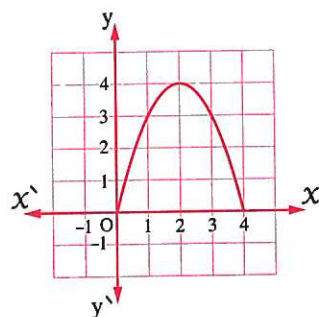
21 If $y^2 x^2 - 4yx + 4 = 0$, then $y \propto \dots\dots\dots$

- (a) x (b) x^2 (c) $\frac{1}{x}$ (d) $\frac{1}{x^2}$

Second Essay questions

- 22 The opposite figure is the graphical representation of $f(x) = 4x - x^2$ where $x \in [0, 4]$, find from the graph :

- 1 The point of the vertex of the curve.
- 2 The equation of the symmetry axis.
- 3 The minimum or maximum value of the function.



23 If a, b, c, d are proportional quantities, show that : $\frac{a+2c}{b+2d} = \frac{c-a}{d-b}$

- 24 Calculate the arithmetic mean and the standard deviation for the following values :
8, 9, 7, 6, 5

Exam 3

First Multiple choice questions

Choose the correct answer from those given :

- 1 The simplest and easiest method of measuring dispersion is the

- (a) mean. (b) median.
(c) range. (d) standard deviation.

2 If $X = \{3\}$, $n(Y) = 5$, then $n(X \times Y) = \dots\dots\dots$

- (a) 1 (b) 5 (c) 8 (d) 15

- 3 The relation which represents an inverse variation between x and y is

- (a) $xy = 5$ (b) $y = x + 3$ (c) $\frac{x}{5} = \frac{y}{3}$ (d) $y = 2x$

Algebra and Statistics

- 4 $-2x^2 \times 3x = \dots\dots\dots$
 (a) $6x^3$ (b) $6x^2$ (c) $-6x^3$ (d) $-5x^3$
-
- 5 If $f(x) = 3$, then $f(1) + f(-1) = \dots\dots\dots$
 (a) 0 (b) 6 (c) 1 (d) 3
-
- 6 If $(x+5, 8) = (1, y+x)$, then $y = \dots\dots\dots$
 (a) 12 (b) 8 (c) -8 (d) -12
-
- 7 The middle proportional between 2 and 8 is $\dots\dots\dots$
 (a) 16 (b) ± 16 (c) 4 (d) ± 4
-
- 8 If $\frac{a}{3} = \frac{b}{5}$, then $\frac{2a+2b}{3b-a} = \dots\dots\dots$
 (a) $\frac{3}{4}$ (b) $\frac{4}{3}$ (c) $\frac{8}{5}$ (d) $\frac{5}{8}$
-
- 9 If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = k$ where $k \in \mathbb{R}$, then $\frac{ace}{bdf} = \dots\dots\dots$
 (a) k^3 (b) k^2 (c) k (d) 3
-
- 10 The function $f : f(x) = x - 2$ is represented by a straight line cutting the y-axis at the point $\dots\dots\dots$
 (a) (2, 0) (b) (0, 2) (c) $(-2, 0)$ (d) $(0, -2)$
-
- 11 The third proportional of 4, 12, ..., 48 is $\dots\dots\dots$
 (a) 7 (b) 32 (c) 16 (d) 36
-
- 12 Twice the number 2^5 is $\dots\dots\dots$
 (a) 4^5 (b) 2^{10} (c) 2^6 (d) 4^{10}
-
- 13 If $y \propto x$ and $y = 20$ when $x = 4$, then $y = \dots\dots\dots$ when $x = 6$
 (a) 30 (b) 15 (c) 60 (d) 24
-
- 14 If $(3, 5) \in \{1, 3\} \times \{x, 7\}$, then $x = \dots\dots\dots$
 (a) 7 (b) 5 (c) 1 (d) 3
-
- 15 If $X = \{1, 2, 5\}$, R represents a function on X where $R = \{(1, 2), (a, 5), (b, 5)\}$, then $a + b = \dots\dots\dots$
 (a) 10 (b) 4 (c) 8 (d) 7

16 If $f(x) = x^2 - 1$, $g(x) = x + 1$, then $f(-1) + g(-1) = \dots\dots\dots$

- (a) 0 (b) -2 (c) 2 (d) 4

17 If $3a = 4b$, then $a : b = \dots\dots\dots$

- (a) 3 : 4 (b) 4 : 3 (c) 3 : 7 (d) 4 : 7

18 If $y \propto \frac{1}{x^2}$, $y = 6$ when $x = 2$, then the variation constant equals $\dots\dots\dots$

- (a) 3 (b) 1.5 (c) 12 (d) 24

19 If $\frac{a}{4} = \frac{4}{8}$, then $a = \dots\dots\dots$

- (a) 2 (b) 16 (c) 8 (d) 4

20 The function $f : f(x) = 2(x^2 - 1)$ is of the $\dots\dots\dots$ degree.

- (a) first (b) second (c) third (d) fourth

21 If $4x^2 - 4xy + y^2 = 0$, then $y \propto \dots\dots\dots$

- (a) $\frac{1}{x}$ (b) $\frac{1}{x^2}$ (c) x (d) x^2

Second Essay questions

22 Represent graphically the function $f : f(x) = x^2 + 2x + 1$ where $x \in [-4, 2]$ and from the graph deduce the coordinates of the vertex of the curve and the minimum or the maximum value of the function.

23 If $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$, find the value of : $\frac{2y - z}{3x - 2y + z}$

24 Calculate the mean and the standard deviation for the values : 3, 6, 7, 9, 15

Exam 4

First Multiple choice questions

Choose the correct answer from those given :

1 The point $(-3, 4)$ lies in the $\dots\dots\dots$ quadrant.

- (a) first (b) second (c) third (d) fourth

2 The range of the values : 7, 3, 6, 9, 5 is $\dots\dots\dots$

- (a) 3 (b) 4 (c) 5 (d) 6

Algebra and Statistics

- 3 If $y \propto x$ and $y = 2$ when $x = 8$, then $y = 3$ when $x = \dots\dots\dots$
(a) 16 (b) 12 (c) 24 (d) 6
-
- 4 If $f(x) = kx + 8$, $f(2) = 0$, then $k = \dots\dots\dots$
(a) 8 (b) -6 (c) 4 (d) -4
-
- 5 If $x, 3, 4, 6$ are proportional quantities, then $x = \dots\dots\dots$
(a) 0 (b) 1 (c) 2 (d) 3
-
- 6 If $x^2 = 25$ where $x \in \mathbb{Z}$, then $x = \dots\dots\dots$
(a) 5 (b) -5 (c) ± 5 (d) -25
-
- 7 If $n(X) = 2$, $n(X \times Y) = 6$, then $n(Y^2) = \dots\dots\dots$
(a) 4 (b) 9 (c) 16 (d) 12
-
- 8 If 3, 6, x are in continued proportion, then $x = \dots\dots\dots$
(a) 12 (b) 18 (c) 24 (d) 36
-
- 9 If $(-1, 2) \in$ the function $f : f(x) = 2x + c$, then $c = \dots\dots\dots$
(a) 2 (b) -2 (c) 4 (d) -4
-
- 10 If $\frac{a}{3} = \frac{b}{5}$, then $\frac{b}{a} = \dots\dots\dots$
(a) $\frac{3}{5}$ (b) $\frac{5}{3}$ (c) $\frac{5}{8}$ (d) $\frac{3}{8}$
-
- 11 $\sqrt{(10)^2 - (6)^2} = 10 - \dots\dots\dots$
(a) 6 (b) 8 (c) 2 (d) 4
-
- 12 If $2x = 5y$, then $y \propto \dots\dots\dots$
(a) x (b) $\frac{1}{x}$ (c) x^2 (d) $\frac{1}{x^2}$
-
- 13 If $\frac{a}{2} = \frac{b}{5} = \frac{c}{7} = \frac{a+b+c}{2x}$, then $x = \dots\dots\dots$
(a) 14 (b) 7 (c) 28 (d) 21
-
- 14 If $X = \{2\}$, then $X^2 = \dots\dots\dots$
(a) $\{4\}$ (b) $(2, 2)$ (c) $\{(4, 4)\}$ (d) $\{(2, 2)\}$

15 If the relation $R = \{(1, 2), (2, 3), (3, 4)\}$, then R represents a function where its range is

- (a) $\{1, 2, 3\}$ (b) $\{2, 3, 4\}$ (c) $\{1, 2, 3, 4\}$ (d) $\{1, 4\}$

16 All the following functions are polynomial except $f : f(x) = \dots\dots\dots$

- (a) $\frac{3}{4}x + 1$ (b) $\sqrt{2}x - 2$ (c) $x\left(\frac{1}{x} + 3\right)$ (d) $x(x - 5)$

17 If y varies inversely as x , then

- (a) $y = x$ (b) $y = mx$ (c) $x = my$ (d) $y = \frac{m}{x}$

18 If b is the middle proportional between a and c , then

- (a) $b = \pm ac$ (b) $b^2 = a^2 c^2$ (c) $b^2 = 2ac$ (d) $b = \pm\sqrt{ac}$

19 If $a, 4, b, 8$ are proportional quantities, then $\frac{a}{b} = \dots\dots\dots$

- (a) $\frac{1}{2}$ (b) 2 (c) 16 (d) 32

20 The function $f : f(x) = 5$ is represented by a straight line passing through the point

- (a) $(5, -5)$ (b) $(5, 0)$ (c) $(0, 5)$ (d) $(0, -5)$

21 If $x^2 y^2 + 16 = 8xy$, then $y \propto \dots\dots\dots$

- (a) x^2 (b) x (c) $4x$ (d) $\frac{1}{x}$

Second Essay questions

22 If b is the middle proportional between a and c , prove that : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

23 Represent graphically the function $f : f(x) = x^2 - 2, x \in [-3, 3]$ and deduce :

- 1 The coordinates of the vertex of the curve.
- 2 The equation of the axis of symmetry.

24 Calculate the mean and the standard deviation for the values : 72, 53, 61, 70, 59

Exam 5

First Multiple choice questions

Choose the correct answer from those given :

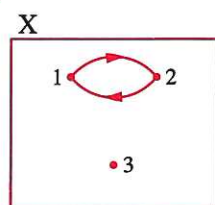
1 If 2, 5, x , 15 are proportional, then $x = \dots\dots\dots$

- (a) 4 (b) 10 (c) 6 (d) 30

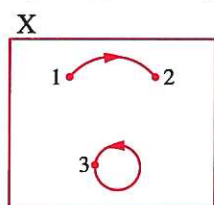
Algebra and Statistics

- 2** The positive square root of the average of squares of deviations of the values from their mean is called the
- (a) range. (b) mean.
(c) standard deviation. (d) mode.
-
- 3** The multiplicative inverse of 2 is
- (a) 2 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) -2
-
- 4** If $X = \{2, 1\}$, $Y = \{0, 2\}$, then $n(X \times Y) = \dots\dots\dots$
- (a) 0 (b) 2 (c) 4 (d) 5
-
- 5** If $f(X) = X + 1$, then which of the following points belongs to the function f ?
- (a) (2, 1) (b) (-1, 1) (c) (-2, 1) (d) (1, 2)
-
- 6** If $y \propto X$, $y = 15$ when $X = 3$, then $y = \dots\dots\dots$ when $X = 5$
- (a) 25 (b) 45 (c) 20 (d) 30
-
- 7** If $3a = 4b$, then $b : a = \dots\dots\dots$
- (a) 3 : 7 (b) 4 : 3 (c) 3 : 4 (d) 4 : 7
-
- 8** The third proportional of 5, 25 is
- (a) 5 (b) 125 (c) ± 125 (d) ± 25
-
- 9** If $\frac{a}{3} = \frac{b}{4} = \frac{c}{5} = \frac{3a-b+c}{2X}$, then $X = \dots\dots\dots$
- (a) 5 (b) 12 (c) 4 (d) 8
-
- 10** If $X^2 = 4$, then $|X| = \dots\dots\dots$
- (a) ± 2 (b) 2 (c) -2 (d) ± 4
-
- 11** If $Y \times X = \{(1, 2), (1, 3)\}$, then $X = \dots\dots\dots$
- (a) {1} (b) {1, 2, 3} (c) (2, 3) (d) {2, 3}
-

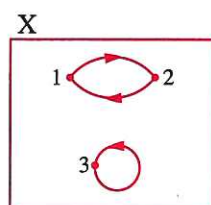
- 12** Which of the following diagrams represents a function on X ?



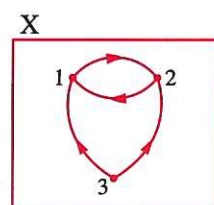
(a)



(b)



(c)



(d)

13 The function $f : f(x) = 2x^2 + 3(x + 1)$ is a polynomial of the degree.

- (a) first (b) second (c) third (d) fourth

14 If $x^2 + 9y^2 = 6xy$, then $y \propto$

- (a) x^2 (b) $\frac{1}{x^2}$ (c) $\frac{1}{x}$ (d) x

15 If $(2 + a, 1) = (3, 3 - b)$, then $a + b =$

- (a) 5 (b) 3 (c) 4 (d) 2

16 If $f(x) = x - 3$, then $f(3) + f(2) =$

- (a) -1 (b) 5 (c) -3 (d) 3

17 If $xy = 5$, then $y \propto$

- (a) $\frac{1}{x}$ (b) $x - 5$ (c) x (d) $x + 5$

18 If $\frac{a}{b} = \frac{b}{3} = 5$, then $a =$

- (a) 15 (b) 45 (c) 75 (d) 125

19 If $f(x) = x^2 - 4$, then the minimum value of the function f is

- (a) -5 (b) -4 (c) -3 (d) zero

20 If $\frac{x}{y} = \frac{3}{4}$, then $4x - 3y =$

- (a) 1 (b) -1 (c) 4 (d) zero

21 If $y \propto \frac{1}{x^2}$, $y = 2$ when $x = 2$, then x could be when $y = \frac{1}{2}$

- (a) $\frac{1}{2}$ (b) 4 (c) 8 (d) 16

Second Essay questions

22 If a, b, c, d are proportional quantities, prove that : $\frac{a-b}{a} = \frac{c-d}{c}$

23 Calculate the standard deviation of : 8, 9, 6, 7, 5

24 Represent graphically the function $f : f(x) = (x - 2)^2$ where $x \in [0, 4]$, then deduce :

- 1 The vertex of the curve.
- 2 The equation of the axis of symmetry.
- 3 The minimum or maximum value.



1

Cairo Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

- 1 The sum of measures of the interior angles of the parallelogram equals
 (a) 90° (b) 180° (c) 270° (d) 360°
- 2 The length of the perpendicular distance between the two straight lines $X + 2 = 0$ and $X = 3$ equals length units.
 (a) 1 (b) 2 (c) 3 (d) 5
- 3 The number of axes of symmetry of the rectangle is
 (a) zero (b) 2 (c) 4 (d) an infinite number.
- 4 The length of the side opposite to the angle of measure 30° in the right-angled triangle equals the length of the hypotenuse.
 (a) quarter (b) third (c) half (d) twice
- 5 If $\sin X = \cos X$ where X is an acute angle , then $m(\angle X) =$
 (a) 30° (b) 45° (c) 60° (d) 90°
- 6 The slope of the straight line whose equation is $aX + by + c = 0$ equals
 (where $b \neq 0$)
 (a) $-\frac{a}{b}$ (b) $\frac{a}{b}$ (c) $-\frac{b}{a}$ (d) $\frac{b}{a}$

2 [a] Without using calculator , find the value of X which satisfies :

$$2X \tan 45^\circ = \tan 60^\circ \cos 30^\circ \quad (\text{Show steps of solution})$$

- [b] Find the equation of the straight line which passes through the point $(1, 5)$ and its slope equals 3

3 [a] Without using calculator , prove that :

$$\cos^2 60^\circ = \tan 45^\circ - \sin^2 60^\circ \quad (\text{Show steps of solution})$$

- [b] ABCD is a parallelogram where $A(3, 4)$, $B(2, -1)$ and $C(-5, 2)$, M is the point of intersection of its diagonals.

Find : 1 The coordinates of the point M

2 The coordinates of the point D

- 4 [a] ABC is a right-angled triangle at B where $AB = 5$ cm. , $AC = 13$ cm.

Prove that : $\sin^2 C + \cos^2 C = 1$

- [b] Prove that the straight line passing through the two points $(3, 2)$, $(1, 3)$ is perpendicular to the straight line $y = 2x + 5$

- 5 [a] Find the diameter length of the circle whose centre is $M(2, 7)$ and passes through the point $A(-1, 3)$

- [b] A straight line its slope equals 3 and intercepted 6 units from the positive part of the y-axis.

Find : 1 The equation of this straight line.

2 Its point of intersection with the X-axis.

2

Giza Governorate



Answer the following questions :

- 1 Choose the correct answer :

- 1 If $\sin 30^\circ = \cos X$, where X is the measure of an acute angle , then the value of $X = \dots\dots\dots$

(a) 15° (b) 30° (c) 45° (d) 60°

- 2 The straight line whose equation is $y = 2x - 8$ intercepts from the positive part of the X-axis a part of length $\dots\dots\dots$ length units.

(a) 1 (b) 3 (c) 4 (d) 7

- 3 The distance between the point $(3, -4)$ and the X-axis equals $\dots\dots\dots$ length units.

(a) 3 (b) 4 (c) 7 (d) 12

- 4 If ΔABC is an isosceles triangle in which $AB = 3$ cm. , $BC = 7$ cm. , then $AC = \dots\dots\dots$ cm.

(a) 3 (b) 4 (c) 7 (d) 10

- 5 If the area of a square is 100 cm^2 , then its perimeter is $\dots\dots\dots$ cm.

(a) 40 (b) 50 (c) 60 (d) 100

- 6 The slope of the straight line which is parallel to the X-axis is $\dots\dots\dots$

(a) undefined (b) zero (c) 1 (d) -1

- 2 [a] If $2 \sin X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$, then without using calculator find the value of X where X is the measure of an acute angle.

- [b] Find the equation of the straight line which passes through the point $(2, -5)$ and it is parallel to the straight line whose equation is $2x + y - 7 = 0$

- 3 [a]** If ABC is a right-angled triangle at B , where $AC = 5$ cm. , $BC = 4$ cm. , then find the value of : $\sin A \cos C + \cos A \sin C$
- [b]** If the point C (3 , 4) is the midpoint of $\overline{AB}$, where A (1 , 2) , then find the coordinates of the point B
-
- 4 [a]** Find the slope of the straight line and the length of the intercepted part of y-axis where its equation is $2x - 3y + 6 = 0$
- [b]** If the distance between the two points (x , 5) and (6 , 1) is $2\sqrt{5}$ length units , then find the value of x
-
- 5 [a]** State the type of the triangle ABC , where its vertices are A (-2 , 4) , B (3 , -1) , C (4 , 5) with respect to its sides.

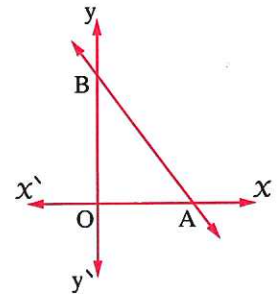
[b] In the opposite figure :

If OA = 3 length units , OB = 4 length units

where O is the origin point , then find :

1 The coordinates of the midpoint of $\overline{AB}$

2 The equation of $\overleftrightarrow{AB}$



3

Alexandria Governorate



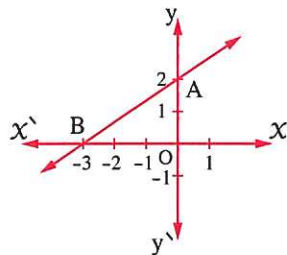
Answer the following questions : (Calculators are permitted)

- 1 Choose the correct answer from those given :**
- 1** The length of the radius of the circle whose center is (-2 , 3) and passes through the point (2 , -1) equals length units.
 (a) 5 (b) $4\sqrt{2}$ (c) 2 (d) 3
- 2** The quadrilateral whose diagonals are equal in length and perpendicular is the
 (a) rhombus. (b) rectangle. (c) square. (d) parallelogram.
- 3** ABCD is a parallelogram , $m(\angle A) + m(\angle C) = 200^\circ$, then $m(\angle B) =$
 (a) 80° (b) 50° (c) 100° (d) 110°
- 4** The volume of the cuboid whose dimensions are $\sqrt{2}$ cm. , $\sqrt{3}$ cm. , $\sqrt{6}$ cm. equals cm^3 .
 (a) $2\sqrt{6}$ (b) $3\sqrt{6}$ (c) $3\sqrt{2}$ (d) 6
- 5** If the triangle ABC is a right-angled triangle at A , then $\sin B : \cos C =$
 (a) $\frac{3}{5}$ (b) $\frac{3}{4}$ (c) 1 (d) $\frac{4}{3}$

6 In the opposite figure :

The slope of $\overrightarrow{AB}$ =

- (a) $-\frac{3}{2}$ (b) $-\frac{2}{3}$
(c) $\frac{3}{2}$ (d) $\frac{2}{3}$



2 [a] Without using the calculator , prove that : $\sin^3 30^\circ = 9 \cos^3 60^\circ - \tan^2 45^\circ$

[b] Prove that the points A (- 3 , 0) , B (3 , 4) , C (1 , - 6) are the vertices of an isosceles triangle and find its surface area.

3 [a] Find the value of X , where X is the measure of an acute angle , if :

$$3 \sin X^\circ \cos^2 45^\circ = \sin^2 60^\circ$$

[b] Find the slope of the straight line $\frac{x}{2} + \frac{y}{3} = 1$, then find the length of y intercept.

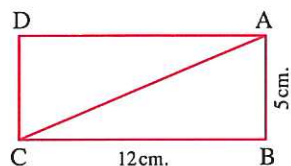
4 [a] If $\overleftrightarrow{CD}$ is parallel to the X -axis , where C (4 , 2) , D (- 5 , y) , find the value of y

[b] In the opposite figure :

ABCD is a rectangle , AB = 5 cm. , BC = 12 cm.

Find : **1** The length of $\overline{AC}$

2 The value of : $5 \tan (\angle ACD) - 13 \sin (\angle DAC)$



5 [a] If the straight line whose equation is : $y - a x + 3 = 0$ is perpendicular to the straight line which passes through the points (5 , 2) , (6 , - 3) , find the value of a

[b] ABC is a triangle , where A (1 , 2) , B (- 2 , 3) , C (- 4 , - 3) , $\overline{AD}$ is a median of the triangle ABC , find the equation of the straight line which passes through the points A , D

4

El-Kalyoubia Governorate



Answer the following questions :

1 Choose the correct answer from the given ones :

1 If ABCD is a parallelogram , then $AD + BC = \dots\dots\dots$

- (a) 2 AC (b) 2 BD (c) 2 AB (d) 2 BC

2 The length of the radius of the circle whose center is (7, 4) and passes through the point (3, 1) equals length units.

- (a) 8 (b) 6 (c) 5 (d) 4

3 If 4, 9, L are the side lengths of a triangle, then L may equal

- (a) 3 (b) 4 (c) 5 (d) 6

4 If the slopes of two parallel straight lines are $-\frac{3}{2}$, $\frac{6}{k}$, then k =

- (a) -4 (b) $\frac{3}{2}$ (c) 2 (d) 9

5 If ABC is a right-angled triangle at B, $m(\angle C) = 30^\circ$, AB = 6 cm, then AC = cm.

- (a) 3 (b) 6 (c) 10 (d) 12

6 If $\tan \frac{a}{b} = 1$, then $\tan \frac{2a}{3b} = \dots\dots\dots$

- (a) $\frac{1}{2}$ (b) $\frac{1}{\sqrt{3}}$ (c) $\frac{2}{3}$ (d) $\sqrt{3}$

2 [a] If C (3, 1) is the midpoint of $\overline{AB}$, where A (1, y), B (x, 3), find : (x, y)

[b] Find the value of x which satisfies : $x \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$

3 [a] If ABCD is a quadrilateral where A (2, 4), B (-3, 0), C (-7, 5) and D (-2, 9), prove that the figure ABCD is a square.

[b] If ABC is a right-angled triangle at C, AB = 13 cm., BC = 12 cm.

, find : 1 The length of $\overline{AC}$ 2 $1 + \tan^2 A$

4 [a] If (0, 1), (a, 3), (2, 5) are collinear, find the value of a

[b] Prove that the straight line which passes through the two points $(4, 3\sqrt{3})$ and $(5, 2\sqrt{3})$ is perpendicular to the straight line which makes with the positive direction of the x-axis an angle of measure 30°

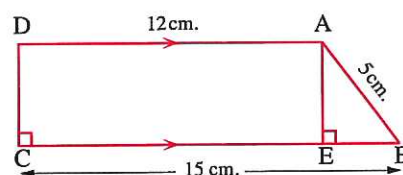
5 [a] Find the equation of the straight line whose slope is 3 and passes through the point (1, 0)

[b] In the opposite figure :

ABCD is a trapezium right-angled at C
 $\overline{AD} \parallel \overline{BC}$, $\overline{AE} \perp \overline{BC}$, AD = 12 cm.
 , AB = 5 cm., BC = 15 cm.

Find : 1 The length of $\overline{AE}$

2 The value of : $\tan(\angle BAE) \times \tan(\angle ACB)$





Answer the following questions : (Calculator is allowed)

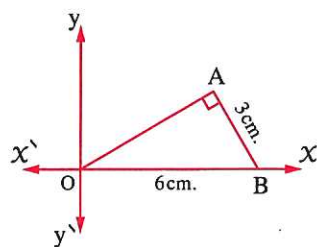
1 Choose the correct answer from those given :

- [1] If the straight line which passes through the two points $(2, 4)$, $(3, k)$ makes an angle of measure 45° with the positive direction of X -axis, then $k = \dots\dots\dots$
- (a) 3 (b) 1 (c) 5 (d) 6
- [2] If $\sin (X + 20)^\circ = \frac{1}{2}$ where $(X + 20)^\circ$ is the measure of an acute angle, then $\tan (55 - X)^\circ = \dots\dots\dots$
- (a) $\frac{\sqrt{3}}{2}$ (b) 1 (c) $\frac{1}{2}$ (d) $\frac{\sqrt{2}}{2}$
- [3] The point $(4, 6)$ is the image of the point $(-2, 2)$ by reflection in the point $\dots\dots\dots$
- (a) origin point. (b) $(-1, -4)$ (c) $(1, 4)$ (d) $(4, 1)$
- [4] If $\overline{AB}$ is a diameter of a circle where $A(-1, 4)$, $B(-3, -2)$, then the area of the circle equals $\dots\dots\dots \pi$ square units.
- (a) 10 (b) $2\sqrt{10}$ (c) 20 (d) 80
- [5] If the ratio between the measures of two supplementary angles is $4 : 5$, then the measure of the greater angle equals $\dots\dots\dots$
- (a) 40° (b) 50° (c) 80° (d) 100°

6 In the opposite figure :

The equation of $\overleftrightarrow{OA}$ is $y = \dots\dots\dots$

- (a) $\sqrt{3}x$ (b) $\frac{1}{2}x$
- (c) $\frac{1}{\sqrt{3}}x$ (d) $\frac{1}{3}x$



- 2 [a]** Find the equation of the straight line which passes through the point $(-6, -1)$ and is parallel to the straight line whose equation is $\frac{1}{2}x + 3y = 1$

[b] Find the value of X if :

$\cos X \tan X + \sin 30^\circ = 1$ where X is the measure of an acute angle.

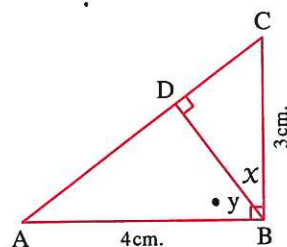
- 3 [a] ABCD is a rectangle in which A (1 , 1) , B (3 , 3) , C (0 , - 3 X) , D (X , y)
find the value of each of X , y

[b] In the opposite figure :

ΔABC is right-angled at B where $\overline{BD} \perp \overline{AC}$

, AB = 4 cm. , BC = 3 cm.

Find the value of : $\tan X \tan y + \sin A$



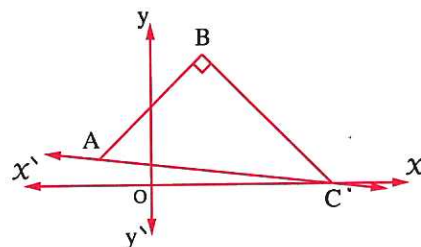
- 4 [a] Find the equation of the straight line which passes through the point (5 , - 2) and is perpendicular to the straight line which passes through the two points (3 , 2) , (- 1 , 0)
- [b] Prove that the points A (1 , 4) , B (- 1 , - 2) , C (2 , - 3) are the vertices of a right-angled triangle at B , then find its area.

- 5 [a] Without using the calculator , prove that : $\cos 60^\circ = 2 \cos^2 30^\circ - \tan 45^\circ$

[b] In the opposite figure :

A (- 2 , 1) , B (2 , 5)

Find the equation of $\overleftrightarrow{AC}$



6

El-Monofia Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- [1] The triangle whose side lengths are 5 cm. , 5 cm. , cm. is an isosceles triangle.
(a) 12 (b) 11 (c) 10 (d) 9
- [2] The number of the axes of symmetry of an equilateral triangle equals
(a) zero (b) 1 (c) 2 (d) 3
- [3] If XYZ is a triangle , $(XY)^2 > (YZ)^2 + (XZ)^2$, then $\angle Z$ is
(a) acute. (b) right. (c) obtuse. (d) straight.
- [4] If $\cos 2X = \frac{1}{2}$, where X is the measure of an acute angle , then X =
(a) 30° (b) 45° (c) 60° (d) 90°
- [5] If $\frac{2}{3}$, $\frac{k}{2}$ are the slopes of two parallel straight lines , then k =
(a) $-\frac{4}{3}$ (b) $-\frac{3}{4}$ (c) $\frac{4}{3}$ (d) 3

Trigonometry and Geometry

- 6 If $\overline{AB}$ is a diameter in a circle of center M , where A (3 , - 5) , B (5 , 1) , then the center of the circle M =
- (a) (2 , 2) (b) (4 , - 2) (c) (4 , 2) (d) (8 , - 2)

- 2 [a] Without using a calculator , find the value of :

$$\sin 45^\circ \cos 45^\circ + \sin 30^\circ \cos 60^\circ - \cos^2 30^\circ$$

- [b] Prove that ΔABC whose vertices are A (1 , - 2) , B (- 4 , 2) , C (1 , 6) is isosceles.

- 3 [a] If ΔABC is a right-angled triangle at C , AB = 10 cm. , BC = 8 cm. , find the value of : $\sin A \cos B + \cos A \sin B$

- [b] Find the equation of the straight line which passes through the point (3 , 4) and is perpendicular to the straight line $3x - 2y + 7 = 0$

- 4 [a] If $2 \sin E = \tan^2 60^\circ - 2 \tan 45^\circ$, where E is the measure of an acute angle , find the value of E

- [b] Prove that the triangle whose vertices are A (1 , 4) , B (- 1 , - 2) , C (2 , - 3) is right-angled at B , then find its surface area.

- 5 [a] Find the slope and the length of the intercepted part from y-axis of the straight line whose equation is $3x + 2y = 6$

- [b] If the points A (0 , 1) , B (k , 3) , C (2 , 5) are collinear , find the value of k

7

El-Gharbia Governorate



Answer the following questions :

- 1 Choose the correct answer from the given answers :

- 1 The number of axes of symmetry of half a circle equals
- (a) 0 (b) 1 (c) 2 (d) an infinite number.
- 2 The straight line whose equation is $y = 3x + 4$ cuts from the positive part of y-axis a part of length length units.
- (a) 2 (b) 3 (c) 4 (d) 7
- 3 The image of the point (3 , - 2) by the reflection in the origin point is
- (a) (3 , 2) (b) (2 , 3) (c) (- 3 , 2) (d) (- 3 , - 2)
- 4 ABCD is a parallelogram , $m(\angle A) + m(\angle C) = 200^\circ$, then $m(\angle B) = \dots\dots\dots$
- (a) 50° (b) 80° (c) 100° (d) 120°

- 5 The equation of the straight line passing through the point (2, 3) and parallel to y-axis is
- (a) $x = 2$ (b) $x = 3$ (c) $y = 2$ (d) $y = 3$
- 6 If $2 \sin X = \tan X$ where X is the measure of an acute angle, then $X = \dots\dots\dots$
- (a) 30° (b) 45° (c) 60° (d) 150°
-
- 2 [a] Without using calculator, find the value of X if : $4X = (\cos 30^\circ \tan 30^\circ \tan 45^\circ)^2$
- [b] If A (3, 2), B (4, -3), C (-1, -2) and D (-2, 3) are the vertices of a rhombus, find :
- 1 The coordinates of the point of intersection of the two diagonals.
- 2 The area of the rhombus.
-
- 3 [a] If A (5, 1), B (3, -7) and C (1, 3), prove that the points A, B, C are not collinear.
- [b] Without using the calculator, find the value of : $3 - \tan 45^\circ \div 4 \sin 30^\circ$
-
- 4 [a] Find the equation of the straight line passing through the two points (2, -1), (1, 1)
- [b] XYZ is a right-angled triangle at Y where XY = 5 cm. and XZ = 13 cm.
- Find the value of : $\tan X + \tan Z$
-
- 5 [a] If the straight line L_1 passes through the two points (3, 1), (2, k) and the straight line L_2 makes with the positive direction of the X-axis an angle of measure 45° , then find the value of k if the two straight lines are perpendicular.
- [b] Find the equation of the straight line which passes through (0, 3) and is parallel to the straight line whose equation is $x + 2y - 1 = 0$

8

El-Dakahlia Governorate



Answer the following questions : (Calculator is permitted)

- 1 [a] Choose the correct answer :
- 1 The slope of the straight line which is perpendicular to y-axis equals
- (a) undefined. (b) zero. (c) -1 (d) 1
- 2 If the ratio between the measures of two complementary angles is 4 : 5, then the measure of the smaller angle equals
- (a) 40° (b) 50° (c) 80° (d) 100°
- 3 If $\tan (X + 10)^\circ = \sqrt{3}$, where $(X + 10)^\circ$ is the measure of an acute angle, then the value of $X = \dots\dots\dots$
- (a) 20° (b) 40° (c) 50° (d) 70°

Trigonometry and Geometry

- [b] If $\overline{AB}$ is a diameter in the circle M where A (8, y), B (x, 3), M (5, 7), find the value of $x + y$

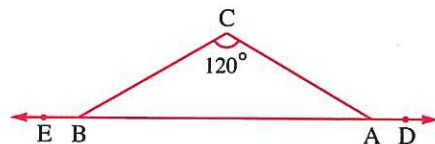
2 [a] Choose the correct answer :

- [1] If the point C is the midpoint of $\overline{AB}$, then $(AB)^2 = \dots\dots\dots (AC)^2$
 (a) 4 (b) 2 (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

[2] In the opposite figure :

If $m(\angle C) = 120^\circ$, $A \in \overleftrightarrow{DE}$, $B \in \overleftrightarrow{DE}$,
 then $m(\angle DAC) + m(\angle EBC) = \dots\dots\dots$

- (a) 60° (b) 180°
 (c) 240° (d) 300°



- [3] The area of the triangle which is bounded by the straight lines $x = 0$, $y = 0$, $\frac{x}{3} - \frac{y}{4} = 1$ equals $\dots\dots\dots$ square units.

- (a) -6 (b) 6 (c) 7 (d) 12

- [b] ABCD is a rhombus in which A (5, 3), B (6, -2), C (1, m), find the value of m

3 [a] Find the value of x which satisfies that :

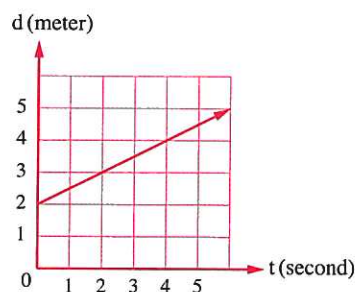
$3 \tan x - 4 \cos^2 60^\circ = 8 \sin^2 30^\circ$, where x is the measure of an acute angle.

- [b] The opposite graph represents the motion of a particle moving with a uniform velocity (v) where the distance (d) is measured in meters and the time (t) in seconds.

Find : [1] The distance at the beginning of the motion.

[2] The velocity of the particle.

[3] The equation of the straight line representing the motion of the particle.



- [4] [a] If the straight line which passes through the two points A (4, 3), B (-2, -3) is parallel to the straight line whose equation is : $(2k + 1)x - ky + 7 = 0$, find the value of k

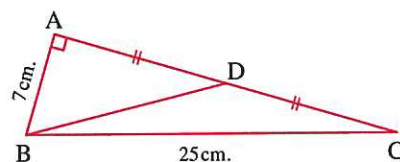
- [b] A ladder $\overline{AB}$ is of length 6 meters, its upper edge A lies on a vertical wall and its other edge B on a horizontal floor. If C is the projection of the point A on the surface of the floor and its angle of slope on the surface of the floor was of measure 60° , then find the length of $\overline{AC}$

5 [a] In the opposite figure :

$\overline{AB} \perp \overline{AC}$, $AB = 7$ cm.

, $BC = 25$ cm. , $AD = CD$

Find : $\tan C + \frac{1}{\tan (\angle ABD)}$



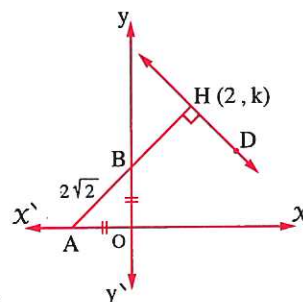
[b] In the opposite figure :

O is the origin point , $OA = OB$, $AB = 2\sqrt{2}$ length units.

If the point $H(2, k)$, $\overrightarrow{AB} \perp \overrightarrow{HD}$

, find : 1 The value of k

2 The equation of $\overrightarrow{HD}$



9

Ismailia Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 The triangle has two angles at least.

(a) acute

(b) right

(c) obtuse

(d) straight

2 Two perpendicular straight lines , if the slope of one is $-\frac{1}{4}$ and the slope of the other is $4k$, then $k =$

(a) -4

(b) 4

(c) 1

(d) $\frac{1}{4}$

3 = 7 cm.

(a) $\overrightarrow{AB}$

(b) $\overline{AB}$

(c) $\overline{AB}$

(d) AB

4 If $\cos (X + 15)^\circ = \frac{1}{2}$, then $\tan X^\circ =$

(a) $\frac{1}{2}$

(b) $\frac{\sqrt{3}}{2}$

(c) $\frac{1}{\sqrt{2}}$

(d) 1

5 The distance between the two points $(6, 0)$, $(0, 8)$ equals length units.

(a) 6

(b) 8

(c) 10

(d) 14

6 If 3 cm. , 7 cm. , L cm. are the lengths of sides of a triangle , then one of the values of $L =$

(a) 3

(b) 4

(c) 7

(d) 10

2 [a] If $2 \sin X^\circ = \tan^2 60^\circ - 2 \tan^2 45^\circ$, find the value of X
(where X is the measure of an acute angle)

[b] Prove that the straight line whose equation is : $4X - 2y = 7$ is parallel to the straight line which passes through the two points $(1, 3)$ and $(2, 5)$

3 [a] Prove that the triangle whose vertices are : A (− 1 , − 1) , B (2 , 3) and C (6 , 0) is a right-angled triangle at B

[b] If the midpoint of $\overline{AB}$ is C (4 , 2) where A (X , 4) and B (6 , y) , find the value of X + y

4 [a] Find the equation of the straight line which passes through the point (2 , − 5) and is perpendicular to the straight line $2x - y + 3 = 0$

[b] Without using the calculator , prove that : $\tan 60^\circ = \frac{2 \tan 30^\circ}{1 - \tan^2 30^\circ}$

5 [a] Find the equation of the straight line which makes an angle of measure 45° with the positive direction of the X-axis and the length of the intercepted part of the y-axis is 3 units from the positive part.

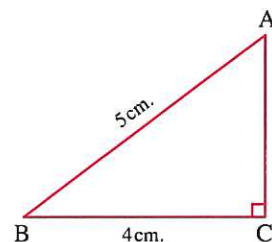
[b] In the opposite figure :

ABC is a right-angled triangle at C

, AB = 5 cm. , BC = 4 cm.

Prove that :

$$\sin A \cos B + \cos A \sin B = 1$$



10

Suez Governorate



Answer the following questions : (Calculator is permitted)

1 Choose the correct answer from those given :

[1] If $\tan (X + 30^\circ) = \sqrt{3}$, X is the measure of an acute angle , then X =

- (a) 60° (b) 30° (c) 45° (d) 90°

[2] The number of axes of symmetry of the equilateral triangle is

- (a) 1 (b) 2 (c) 3 (d) 4

[3] If $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$, and the slope of $\overleftrightarrow{AB} = \frac{1}{3}$, then the slope of $\overleftrightarrow{CD} = \dots\dots\dots$

- (a) 3 (b) − 3 (c) $\frac{1}{3}$ (d) $-\frac{1}{3}$

[4] The distance between the point (− 3 , 4) and y-axis is length units.

- (a) 4 (b) − 4 (c) 3 (d) − 3

[5] The area of the rhombus whose diagonals lengths are 6 cm. , 8 cm. is cm^2

- (a) 48 (b) 24 (c) 14 (d) 7

6 The volume of the cube whose edge length is 2 cm. is cm^3

(a) 8

(b) 4

(c) 16

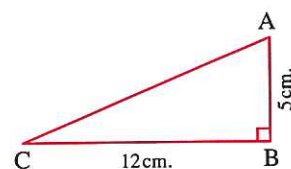
(d) 64

2 [a] In the opposite figure :

ABC is a right-angled triangle at B

, AB = 5 cm. , BC = 12 cm.

Prove that : $\cos A \cos C = \sin A \sin C$



[b] Find the equation of the straight line which passes through the point (0 , 3) and makes a positive angle of measure 45° with the positive direction of X-axis.

3 [a] If A = (- 1 , 1) , B = (0 , 5) , C = (5 , 6) and D = (4 , 2)

, prove that : ABCD is a parallelogram.

[b] Without using calculator , prove that : $2 \sin 30^\circ = \tan^2 60^\circ - 2 \tan 45^\circ$

4 [a] If the point C = (5 , 4) is the midpoint of $\overline{AB}$, A = (3 , - 1) , find the coordinates of the point B

[b] Prove that the straight line passing through the points (- 1 , 4) and (2 , 5) is parallel to the straight line whose equation is $3y = x + 4$

5 [a] If the distance between the two points (x , 3) and (0 , 2) is $5\sqrt{2}$ length units , find x

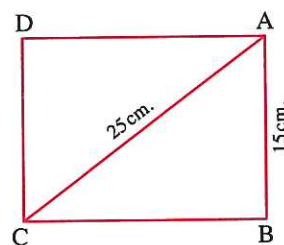
[b] In the opposite figure :

ABCD is a rectangle

, AB = 15 cm. , AC = 25 cm.

Find : 1 m ($\angle ACB$)

2 The area of the rectangle ABCD



11

Damietta Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 The equation of the y-axis is

(a) $x = 0$

(b) $y = x$

(c) $y = 0$

(d) $y = -x$

2 The sum of the measures of the accumulative angles at a point equals

(a) 90°

(b) 180°

(c) 270°

(d) 360°

Trigonometry and Geometry

- 3 The perpendicular distance between the two straight lines :

$X = 2$ and $X + 3 = 0$ equals length units.

(a) 6 (b) 5 (c) 3 (d) 2

- 4 If $2 \sin X - 1 = 0$ (where X is an acute angle) , then $m(\angle X) = \dots\dots\dots$

(a) 30° (b) 45° (c) 60° (d) 90°

- 5 The number of axes of symmetry of the isosceles triangle equals

(a) 3 (b) 2 (c) 1 (d) zero

- 6 ABC is a triangle , if $m(\angle B) > m(\angle C)$, then

(a) $AC - AB < 0$ (b) $AC - AB > 0$ (c) $BC \leq AB$ (d) $AC - AB \leq 0$

- 2 [a] Without using calculator , prove that : $\tan^2 60^\circ - 2 \sin 45^\circ \cos 45^\circ = 2$

- [b] Find the equation of the straight line whose slope equals the slope of the straight line

$\frac{y-1}{x} = \frac{1}{3}$ and intercepts a negative part of y-axis of 4 length units.

- 3 [a] If $3 \tan X = 4 \sin^2 30^\circ + 8 \cos^2 60^\circ$, find the value of X

(where X is the measure of an acute angle)

- [b] If the straight line L_1 passes through the two points $(3, 1)$ and $(2, k)$ and the straight line L_2 makes with the positive direction of the X -axis a positive angle whose measure is 135° , then find k if the two straight lines L_1 and L_2 are parallel.

- 4 [a] If the point $C(4, y)$ is the midpoint of $\overline{AB}$ where $A(X, 3)$ and $B(6, 5)$, find the value of $X + y$

- [b] If the points $A(6, 0)$, $B(2, 0)$ and $C(4, 2\sqrt{3})$ are three points in a cartesian coordinates plane , prove that : $\triangle ABC$ is equilateral.

- 5 [a] Find the equation of the straight line which passes through the point $(-2, 3)$ and is perpendicular to the straight line whose equation is $2y + x + 1 = 0$

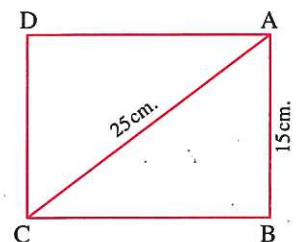
- [b] In the opposite figure :

ABCD is a rectangle in which

$AB = 15$ cm. and $AC = 25$ cm.

Find : 1 $\cos(\angle ACB)$

2 The surface area of the rectangle ABCD





Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

- 1** If $\cos X = \frac{\sqrt{3}}{2}$ where X is the measure of an acute angle , then $X = \dots\dots\dots$
 (a) 30° (b) 45° (c) 60° (d) 90°
- 2** If $\overrightarrow{AB} \parallel \overrightarrow{CD}$ and the slope of $\overrightarrow{AB} = \frac{2}{3}$, then the slope of $\overrightarrow{CD} = \dots\dots\dots$
 (a) $\frac{2}{3}$ (b) $-\frac{2}{3}$ (c) $\frac{3}{2}$ (d) $-\frac{3}{2}$
- 3** The distance between the point $(-5, 3)$ and the y-axis is $\dots\dots\dots$ length units.
 (a) -5 (b) -3 (c) 3 (d) 5
- 4** In the triangle ABC , if $(AC)^2 < (AB)^2 + (BC)^2$, then $\angle B$ is $\dots\dots\dots$
 (a) an acute angle. (b) an obtuse angle. (c) a right angle. (d) a reflex angle.
- 5** ABCD is a parallelogram , if $m(\angle A) = 80^\circ$, then $m(\angle C) = \dots\dots\dots$
 (a) 40° (b) 80° (c) 100° (d) 160°
- 6** If the lengths of two sides in a triangle are 5 cm. and 9 cm. , then the length of the third side can be equal to $\dots\dots\dots$ cm.
 (a) 3 (b) 4 (c) 14 (d) 8

- 2 [a]** State the kind of the triangle whose vertices are the points A $(-2, 4)$, B $(3, -1)$, C $(4, 5)$ with respect to its sides.

- [b]** If $\tan X - 4 \cos 60^\circ \sin 30^\circ = \text{zero}$, find the value of X where X is the measure of an acute angle.

- 3 [a]** $\triangle ABC$ is a right-angled triangle at B , $AB = 6$ cm. , $BC = 8$ cm.

1 Find the value of : $\cos A \cos C - \sin A \sin C$

2 Calculate : $m(\angle C)$

- [b]** Find the slope of the straight line whose equation is $\frac{y-2}{x} = \frac{1}{2}$, then find the length of the intercepted part of y-axis.

- 4 [a]** Prove that : $\sin^2 45^\circ = 2 \cos^2 30^\circ - 1$

- [b]** Find the equation of the straight line which passes through the point $(3, -5)$ and is parallel to the straight line which makes with the positive direction of the X -axis an angle of measure 45°

5 [a] If the point C (4 , y) is the midpoint of $\overline{AB}$ where A = (6 , 5) and B = (X , 3) , find the value of X + y

[b] Prove that the straight line passing through the two points (− 2 , 5) and (− 2 , 4) is perpendicular to the straight line passing through the two points (2 , 3) and (5 , 3)

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Assiut Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

[1] The distance between the point (− 4 , − 3) and the X-axis equals length units.

- (a) − 3 (b) 3 (c) 4 (d) − 4

[2] If $\triangle ABC \equiv \triangle XYZ$, $m(\angle A) = 50^\circ$, $m(\angle B) = 60^\circ$, then $m(\angle X) + m(\angle Y) = \dots\dots\dots$

- (a) 110° (b) 120° (c) 140° (d) 70°

[3] If $\sin X^\circ = \cos 30^\circ$, then $\tan X^\circ = \dots\dots\dots$ (where X is the measure of an acute angle)

- (a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$ (c) $\sqrt{2}$ (d) $\frac{1}{\sqrt{2}}$

[4] If two vertically opposite angles are supplementary , then the measure of each angle of them equals

- (a) 45° (b) 60° (c) 90° (d) 180°

[5] If the two straight lines $y = \ell X + e$, $y = n X + o$ are parallel , (where ℓ , e , n , o are real numbers) , then $\ell - n = \dots\dots\dots$

- (a) − 2 (b) − 1 (c) 1 (d) zero

[6] A triangle has only one axis of symmetry and the lengths of two sides are 4 cm. and 8 cm. , so the length of the third side is cm.

- (a) 12 (b) 8 (c) 4 (d) 2

2 [a] Without using the calculator , find the value of : $\sin^2 60^\circ + \cos^2 60^\circ + \tan^2 45^\circ$

[b] Find the equation of the straight line which passes through the two points (2 , − 1) , (1 , 1)

3 [a] If ABC is a right-angled triangle at B , AB = 12 cm. , AC = 13 cm. , find $m(\angle C)$ to the nearest degree.

[b] If the straight line L_1 passes through the two points (X , − 1) , (6 , 3) and the straight line L_2 makes with the positive direction of the X-axis an angle of measure 45° , find the value of X if L_1 is perpendicular to L_2

4 [a] Without using the calculator , prove that : $\cos 30^\circ = \frac{\sin 30^\circ \sin 60^\circ}{\sin 45^\circ \cos 45^\circ}$

[b] If the points A (1 , 0) , B (− 1 , 4) , C (7 , 8) and D (9 , 4) are in perpendicular coordinates plane , prove that the figure ABCD is a parallelogram.

5 [a] Find the slope of the straight line and the length of the y-intercept by the straight line whose equation is $\frac{x}{2} + \frac{y}{3} = 1$

[b] In the opposite figure :

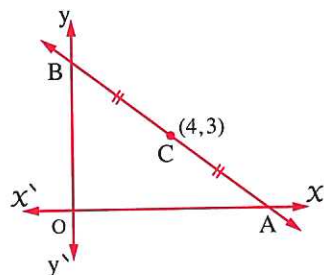
The point C is the midpoint of $\overline{AB}$

where C (4 , 3)

Find (show the steps) :

1 The coordinates of the points A and B

2 The equation of $\overleftrightarrow{AB}$



14

Luxor Governorate



Answer the following questions :

1 Choose the correct answer :

1 If C is an acute angle where $\sin C = \cos C$, then $\tan C = \dots\dots\dots$

- (a) 1 (b) $\sqrt{2}$ (c) $\sqrt{3}$ (d) $\frac{\sqrt{3}}{3}$

2 The straight line whose equation is $2x + 3y = 6$ intersects the x-axis at the point $\dots\dots\dots$

- (a) (2 , 0) (b) (3 , 0) (c) (0 , 2) (d) (0 , 3)

3 ABCD is a square , A (1 , 1) , C (4 , 4) , then its surface area = $\dots\dots\dots$ square units.

- (a) 3 (b) 6 (c) 9 (d) 18

4 ABC is a triangle , $m(\angle A) : m(\angle B) : m(\angle C) = 3 : 4 : 5$, then $m(\angle B) = \dots\dots\dots$

- (a) 30° (b) 45° (c) 60° (d) 90°

5 ABCD is a parallelogram , then $\overline{AB} \parallel \dots\dots\dots$

- (a) CD (b) $\overline{AD}$ (c) AD (d) $\overline{CD}$

6 The length of the side opposite to the angle of measure 30° in the right-angled triangle equals $\dots\dots\dots$ the length of the hypotenuse.

- (a) half (b) double (c) third (d) quarter

2 [a] If X is an acute angle , find the value of $m(\angle X)$ when

$$\sin X = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$$

[b] Prove that the points A (0 , 1) , B (1 , 2) , C (2 , 3) are collinear.

Trigonometry and Geometry

3 [a] Without using calculator , prove that : $\tan 30^\circ \tan 60^\circ = \sin^2 45^\circ + \cos^2 45^\circ$

[b] If the straight line $kx - 2y - 5 = 0$ makes a positive angle with the positive direction of the x -axis of measure 45° , find the value of k

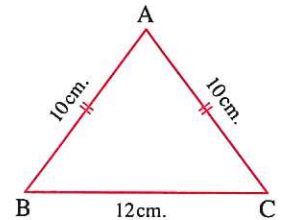
4 [a] If $AB = 5$ units of length , $A(6, x)$, $B(2, 0)$, find the value of x

[b] In the opposite figure :

$AB = AC = 10$ cm. , $BC = 12$ cm.

Find : **1** $\cos B$

2 $m(\angle B)$



5 [a] Find the equation of the axis of symmetry of $\overline{AB}$ where $A(-1, 4)$, $B(1, 2)$

[b] ABCD is a rectangle , $A(1, 1)$, $B(3, 3)$, $C(0, -3x)$, $D(x, y)$

Find the value of each of x and y

15

New Valley Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 $\triangle ABC$ is a right-angled triangle at B , $m(\angle C) = 30^\circ$, $AB = 6$ cm. , then $AC = \dots\dots\dots$ cm.

- (a) 3 (b) 6 (c) 12 (d) 9

2 The distance between the two points $(3, 0)$ and $(0, -4)$ equals $\dots\dots\dots$ length units.

- (a) 4 (b) 3 (c) 7 (d) 5

3 If $\sin x = \frac{1}{2}$ where x is the measure of an acute angle , then $\sin 2x = \dots\dots\dots$

- (a) 1 (b) $\frac{1}{4}$ (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{\sqrt{3}}$

4 If the two straight lines whose slopes are $-\frac{2}{3}$ and $\frac{k}{2}$ are parallel , then $k = \dots\dots\dots$

- (a) $-\frac{4}{3}$ (b) $-\frac{3}{4}$ (c) $\frac{1}{3}$ (d) 3

5 The measure of each interior angle of the regular pentagon equals $\dots\dots\dots$

- (a) 60° (b) 108° (c) 120° (d) 135°

6 The two diagonals are equal in length and not perpendicular in the $\dots\dots\dots$

- (a) square. (b) rhombus. (c) rectangle. (d) parallelogram.

- 2 [a]** Find the value of X , where $0^\circ < X < 90^\circ$, if :

$$\sin X = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$$

- [b]** Prove that the points A (1 , 1) , B (2 , 2) and C (3 , 3) are collinear.

- 3 [a]** Find the equation of the straight line which makes with the positive direction of X -axis a positive angle whose $\tan = 2$ and intercepts from the positive part of y -axis 7 length units.

- [b]** Show the type of $\triangle ABC$ such that A (− 2 , 4) , B (3 , − 1) and C (4 , 5) according to its side lengths.

- 4 [a]** If $\triangle ABC$ is a right-angled triangle at C , $AB = 13$ cm. , $BC = 12$ cm. , **prove that :** $\sin A \cos B + \cos A \sin B = 1$

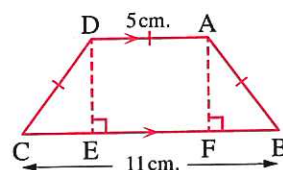
- [b]** Find the equation of the straight line which passes through the point (1 , 6) and the midpoint of $\overline{AB}$ where A (1 , − 2) , B (3 , − 4)

- 5 [a]** Prove that the straight line passing through the two points (3 , − 4) and (1 , − 2) is perpendicular to the straight line that makes a positive angle of measure 45° with the positive direction of X -axis.

- [b] In the opposite figure :**

ABCD is an isosceles trapezium in which
 $\overline{AD} \parallel \overline{BC}$, $AB = AD = DC = 5$ cm.
 , $BC = 11$ cm.

Find : $m(\angle B)$ and the area of the trapezium ABCD



Examinations on Port Said Specifications



on Trigonometry and Geometry

Exam

1

Port Said 2023

First Multiple choice questions

Choose the correct answer from those given :

1 If $\sin X = \frac{1}{2}$ where X is the measure of an acute angle , then $\cos 2 X = \dots\dots\dots$

- (a) $\frac{1}{2}$ (b) 1 (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{\sqrt{3}}{3}$

2 If $\overrightarrow{AB} \parallel \overrightarrow{CD}$ and the slope of $\overrightarrow{AB} = \frac{2}{3}$, then the slope of $\overrightarrow{CD} = \dots\dots\dots$

- (a) $\frac{3}{2}$ (b) $-\frac{3}{2}$ (c) $\frac{2}{3}$ (d) $-\frac{2}{3}$

3 The radius length of the circle whose centre is (0 , 0) and passes through the point (3 , 4) equals $\dots\dots\dots$ length units.

- (a) 3 (b) 4 (c) 5 (d) 7

4 The triangle whose side lengths are 3 cm. , 4 cm. , 5 cm is $\dots\dots\dots$

- (a) acute-angled. (b) right-angled.
(c) obtuse-angled. (d) with congruent angles.

5 In the right-angled triangle ABC , if $m(\angle B) = 90^\circ$, then $\sin A - \cos C = \dots\dots\dots$

- (a) $2 \sin A$ (b) $2 \cos C$ (c) zero (d) 1

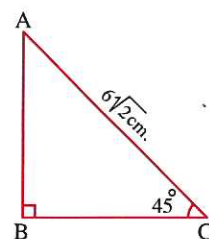
6 If $\overline{AB}$ is a diameter in a circle where A (3 , -5) and B (5 , 1) , then the centre of this circle is the point $\dots\dots\dots$

- (a) (4 , -2) (b) (4 , 2) (c) (2 , -2) (d) (8 , -4)

7 In the opposite figure :

AB = $\dots\dots\dots$ cm.

- (a) 3 (b) 4
(c) 5 (d) 6



8 A square of perimeter = 16 cm. , its area = $\dots\dots\dots$

- (a) 4 cm^2 (b) 8 cm^2 (c) 16 cm^2 (d) 24 cm^2

- 9 The equation of the line which passes through the point $(2, -3)$ and is parallel to y-axis is
- (a) $y = -3$ (b) $x = 2$ (c) $y = 3$ (d) $x = -2$
-
- 10 The slope of the line that makes an angle of measure 45° with the positive direction of X-axis is
- (a) $\frac{1}{2}$ (b) 1 (c) $\sqrt{3}$ (d) $\frac{\sqrt{3}}{2}$
-
- 11 The complementary angle for the angle of measure 60° is an angle of measure
- (a) 120° (b) 0° (c) 30° (d) 90°
-
- 12 $4 \cos 60^\circ \sin 30^\circ = \dots\dots\dots$
- (a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) 4 (d) 1
-
- 13 The line whose equation is $y = 3x + 4$ cuts from the positive part of the y-axis length units.
- (a) 2 (b) 3 (c) 4 (d) 7
-
- 14 The slope of the line that is parallel to the X-axis is
- (a) -1 (b) zero (c) 1 (d) undefined.
-
- 15 The sum of the measures of all interior angles of any quadrilateral is
- (a) 90° (b) 180° (c) 360° (d) 540°
-
- 16 For any angle of measure a , then $\frac{\sin a}{\cos a} = \dots\dots\dots$
- (a) $\sin a \cos a$ (b) 1 (c) $\tan a$ (d) -1
-
- 17 The slope of the line whose equation is : $2x - 2y = 3$ is
- (a) 3 (b) 2 (c) -2 (d) 1
-
- 18 If $\sin H = 0.6214$, then $m(\angle H) \approx \dots\dots\dots$
- (a) $55^\circ 38'$ (b) $38^\circ 25'$ (c) $83^\circ 52'$ (d) $48^\circ 52'$
-
- 19 The length of the perpendicular from $(3, -4)$ to the X-axis is length units.
- (a) 3 (b) -4 (c) 4 (d) 5
-
- 20 $\sin 70^\circ = \cos \dots\dots\dots$
- (a) 110° (b) 20° (c) 290° (d) 360°
-
- 21 The line whose equation is : $2x + 3y = 0$ passes through the point
- (a) $(3, 2)$ (b) $(2, 3)$ (c) $(0, 0)$ (d) $(1, -1)$

Second Essay questions

- 22** Find the equation of $\overleftrightarrow{AB}$ which passes through A (0 , 4) and B (4 , 0)
- 23** ABC is a triangle in which $\angle B$ is a right angle , AB = 5 cm. and BC = 12 cm.
Find : $\sin^2 A + \cos^2 A$
- 24** Show the type of ΔABC with respect to its sides where : A (3 , 3) , B (1 , 5) and C (1 , 3)

Exam 2 Port Said 2024

First Multiple choice questions

Choose the correct answer from those given :

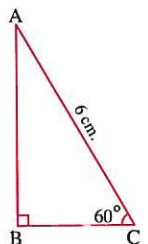
- 1** If the origin point is the midpoint of $\overleftrightarrow{AB}$ and A (5 , - 2) , then B =
(a) (2 , 5) (b) (5 , - 2) (c) (- 2 , - 5) (d) (- 5 , 2)
- 2** $2 \sin 30^\circ \tan 60^\circ = \dots\dots\dots$
(a) $\sqrt{3}$ (b) 3 (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{2}$
- 3** The distance between the two points (3 , a) and (- 1 , a) equals length units.
(a) 3 (b) 4 (c) 9 (d) 16
- 4** If X , y are the measures of two complementary angles and $\sin X = \frac{3}{5}$, then $\cos y = \dots\dots\dots$
(a) $\frac{4}{5}$ (b) $\frac{3}{5}$ (c) $\frac{5}{4}$ (d) $\frac{5}{3}$
- 5** $44.125^\circ = \dots\dots\dots$ in degrees , minutes and seconds.
(a) $44^\circ 7' 30''$ (b) $44^\circ 30' 7''$ (c) $44^\circ 17' 30''$ (d) $44^\circ 30' 17''$
- 6** The sum of measures of all interior angles of a triangle equals
(a) 120° (b) 150° (c) 180° (d) 360°
- 7** For any acute angle of measure a , then $\sin a - \cos a \tan a = \dots\dots\dots$
(a) - 1 (b) 0 (c) 1 (d) 2
- 8** If m_1 , m_2 are the slopes of two parallel lines , then
(a) $m_1 - m_2 = 0$ (b) $m_1 + m_2 = 0$ (c) $m_1 m_2 = 0$ (d) $m_1 - m_2 \neq 0$
- 9** A circle its centre is the origin point and its radius length equals 5 cm. , then the point (3 , 4) lies the circle.
(a) inside (b) outside (c) on (d) on the centre of

- 10 If $X \cos 60^\circ = \tan 45^\circ$, then $X = \dots\dots\dots$
 (a) 2 (b) 1 (c) $\frac{1}{2}$ (d) $\sqrt{2}$
-
- 11 If ABCD is a square, then $m(\angle ABD) = \dots\dots\dots$
 (a) 30° (b) 45° (c) 60° (d) 90°
-
- 12 The product of the slopes of two perpendicular lines equals $\dots\dots\dots$
 (a) zero (b) 1 (c) -1 (d) $\frac{1}{2}$
-
- 13 The line whose equation is : $y - 3X + 1 = 0$ passes through the point $\dots\dots\dots$
 (a) (1 , 2) (b) (2 , 1) (c) (0 , 3) (d) (3 , 0)
-
- 14 If $\sin(X + 7)^\circ = \frac{1}{2}$ where X is the measure of an acute angle, then $X = \dots\dots\dots$
 (a) 60° (b) 30° (c) 23° (d) 13°
-
- 15 The number of symmetry axes of an isosceles triangle equals $\dots\dots\dots$
 (a) zero (b) 1 (c) 2 (d) 3
-
- 16 If $A = (5, 7)$ and $B = (1, -1)$, then the midpoint of $\overline{AB}$ is $\dots\dots\dots$
 (a) (2 , 3) (b) (3 , 3) (c) (3 , 2) (d) (3 , 4)
-
- 17 ABC is a triangle in which $m(\angle A) = 85^\circ$, $\sin B = \cos B$, then $m(\angle C) = \dots\dots\dots$
 (a) 30° (b) 45° (c) 50° (d) 60°
-
- 18 The equation of the line that passes through the origin point and has slope = 1 is $\dots\dots\dots$
 (a) $y = X$ (b) $y = -X$ (c) $y = 2X$ (d) $y = 0$
-
- 19 The equation of the line which passes through the point $(-5, 3)$ and is parallel to X -axis is $\dots\dots\dots$
 (a) $X = -5$ (b) $y = -5$ (c) $y = 3$ (d) $X = 3$
-
- 20 The line whose equation is : $3y = 2X - 6$ cuts from the y -axis a part of length $\dots\dots\dots$ units.
 (a) 6 (b) -6 (c) 2 (d) -2
-

21 In the opposite figure :

AB = $\dots\dots\dots$ cm.

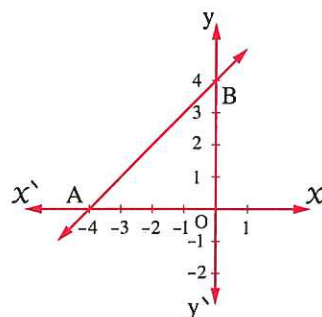
- (a) 3 (b) $2\sqrt{3}$
 (c) $3\sqrt{3}$ (d) $\sqrt{6}$



Second Essay questions

- 22** If $\cos H = \sin^2 45^\circ \tan 60^\circ$, find the measure of the acute angle H
- 23** Show that $A(-3, -1)$, $B(6, 5)$ and $C(3, 3)$ are three collinear points.
- 24** In the opposite figure :

Find the equation of $\overleftrightarrow{AB}$ which cuts from the negative the X -axis and positive the y -axis two equal parts of length 4 length units.



Exam 3

First Multiple choice questions

Choose the correct answer from those given :

- 1** If $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$ and the slope of $\overleftrightarrow{AB} = \frac{1}{2}$, then the slope of $\overleftrightarrow{CD} = \dots\dots\dots$
- (a) 2 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) -2
- 2** The perpendicular distance between the two straight lines : $y + 1$, $y + 3 = 0$ equals $\dots\dots\dots$ length units.
- (a) 4 (b) 2 (c) 1 (d) 5
- 3** The equation of the straight line which is passing through $(2, 3)$ and parallel to the X -axis is $\dots\dots\dots$
- (a) $x = 2$ (b) $x = 3$ (c) $y = 2$ (d) $y = 3$
- 4** The number of the axes of symmetry of the isosceles triangle is $\dots\dots\dots$
- (a) 1 (b) 2 (c) 3 (d) 4
- 5** The distance between $(4, 3)$ and the y -axis is $\dots\dots\dots$ length units.
- (a) -3 (b) -4 (c) 3 (d) 4
- 6** The point $(-1, 3)$ is the image of the point $(5, 3)$ by reflection in the point $\dots\dots\dots$
- (a) $(0, 0)$ (b) $(4, 6)$ (c) $(2, 3)$ (d) $(-2, -3)$
- 7** If ΔABC is right-angled at A , then $\sin B = \dots\dots\dots$
- (a) $\frac{AC}{BC}$ (b) $\frac{AB}{AC}$ (c) $\frac{BC}{AC}$ (d) $\frac{AC}{AB}$

- 8 The slope of the straight line : $3x + 2y - 5 = 0$ is
 (a) $\frac{3}{2}$ (b) $-\frac{3}{2}$ (c) $\frac{2}{3}$ (d) $\frac{5}{2}$
-
- 9 If $\sin X = \frac{1}{2}$, where X is the measure of an acute angle, then $\sin 2X = \dots\dots\dots$
 (a) $\frac{1}{4}$ (b) 1 (c) $\sqrt{3}$ (d) $\frac{\sqrt{3}}{2}$
-
- 10 The parallelogram whose diagonals are perpendicular and equal in length is
 (a) a square. (b) a rhombus. (c) a rectangle. (d) a trapezium.
-
- 11 If $\triangle ABC$ is right-angled at B and $\sin A = \frac{3}{5}$, then $\cos C = \dots\dots\dots$
 (a) $\frac{5}{3}$ (b) $\frac{4}{5}$ (c) $\frac{5}{4}$ (d) $\frac{3}{5}$
-
- 12 The distance between $(3, -4)$ and the origin point is length units.
 (a) 5 (b) 1 (c) -1 (d) -5
-
- 13 The straight line : $x + 2y = 6$ cuts from the positive part of the y-axis a part of length units.
 (a) 6 (b) 3 (c) 2 (d) -3
-
- 14 If $\tan (X + 10^\circ) = 1$ where X is the measure of an acute angle, then $X = \dots\dots\dots$
 (a) 45° (b) 35° (c) 55° (d) 50°
-
- 15 If $\triangle XYZ$ is right-angled at Y, $XY = 12$ cm., $YZ = 5$ cm., then $\sin^2 X + \sin^2 Z = \dots\dots\dots$
 (a) 1 (b) $\frac{25}{144}$ (c) $\frac{144}{169}$ (d) $\frac{25}{169}$
-
- 16 The angle of measure 40° complements an angle of measure
 (a) 50° (b) 80° (c) 90° (d) 140°
-
- 17 If $a \sin 30^\circ = 4 \sin 45^\circ \cos 45^\circ$, then $a = \dots\dots\dots$
 (a) 2 (b) 4 (c) 8 (d) 16
-
- 18 The slope of the straight line passing through the two points $(3, -1)$, $(1, -2)$ is
 (a) 2 (b) $\frac{1}{2}$ (c) -2 (d) $-\frac{1}{2}$
-
- 19 If C $(2, 1)$ is the midpoint of $\overline{AB}$ where A $(4, -1)$, then B =
 (a) $(6, 0)$ (b) $(2, 2)$ (c) $(0, 3)$ (d) $(2, 0)$

Trigonometry and Geometry

- 20** If the straight line whose equation is : $aX + y = 5$ is parallel to the straight line passing through $(1, 4)$, $(3, 5)$, then $a = \dots\dots\dots$
- (a) $-\frac{1}{4}$ (b) $\frac{3}{5}$ (c) $-\frac{1}{2}$ (d) $\frac{1}{2}$
-
- 21** If $\sin 2X = 2 \sin 30^\circ \cos 60^\circ$, where X is the measure of an acute angle, then $X = \dots\dots\dots$
- (a) 15° (b) 30° (c) 45° (d) 60°

Second Essay questions

- 22** Determine the type of $\triangle ABC$ where $A(1, 1)$, $B(5, 1)$, $C(3, 4)$ according to the lengths of its sides.
-
- 23** Find the equation of the straight line which passes through $(3, -5)$ and parallel to the straight line : $X + 3y = 7$
-
- 24** Find the value of : $\cos 60^\circ \sin 30^\circ - \sin 60^\circ \tan 60^\circ + \cos^2 30^\circ$

Exam 4

First Multiple choice questions

Choose the correct answer from those given :

- 1** The equation of the straight line which is perpendicular to the y -axis is $\dots\dots\dots$
- (a) $X = 0$ (b) $y = X$ (c) $y = -X$ (d) $y = 0$
-
- 2** If $X \cos 60^\circ = \tan 45^\circ$, then $X = \dots\dots\dots$
- (a) $\frac{1}{2}$ (b) 2 (c) $\frac{1}{\sqrt{2}}$ (d) $\frac{\sqrt{3}}{2}$
-
- 3** The measure of the exterior angle of the equilateral triangle is $\dots\dots\dots$
- (a) 120° (b) 90° (c) 60° (d) 30°
-
- 4** The slope of the straight line that makes with the positive direction of the X -axis a positive angle of measure θ equals $\dots\dots\dots$
- (a) $\sin \theta$ (b) $\cos \theta$ (c) $\frac{\sin \theta}{\cos \theta}$ (d) $\sin \theta + \cos \theta$
-
- 5** The slope of the straight line which makes an angle of measure 60° with the positive direction of the X -axis is $\dots\dots\dots$
- (a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{1}{\sqrt{3}}$ (d) $\sqrt{3}$

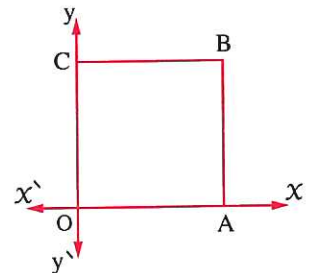
- 6 If the y-axis bisects $\overline{AB}$ such that A (3 , 2) , B (X , y) , then X =
 (a) - 3 (b) - 2 (c) 2 (d) 3
-
- 7 If A (2 , - 1) , B (- 4 , 3) , then the midpoint of $\overline{AB}$ is
 (a) (2 , 2) (b) (- 2 , - 4) (c) (- 1 , 1) (d) (3 , - 2)
-
- 8 If $\cos X = \frac{\sqrt{3}}{2}$, where X is the measure of an acute angle , then $\sin 2 X =$
 (a) 1 (b) $\frac{\sqrt{3}}{2}$ (c) - 2 (d) $\frac{1}{\sqrt{3}}$
-
- 9 If ΔXYZ is right-angled at Y , $XY = 16$ cm. , $m(\angle X) = 54^\circ$, then $YZ \approx$ cm.
 (a) 22 (b) 14 (c) 12 (d) 15
-
- 10 The distance between the two points (- 2 , 5) , (- 2 , - 4) is length units.
 (a) - 2 (b) 1 (c) 0 (d) 9
-
- 11 If A lies on the axis of symmetry of $\overline{XY}$, then $\overline{AX} \dots\dots\dots \overline{AY}$
 (a) // (b) = (c) $\equiv$ (d) $\perp$
-
- 12 If ΔABC is right-angled at B , $AB = 8$ cm. , $BC = 6$ cm. , then $\sin C =$
 (a) $\frac{3}{4}$ (b) $\frac{4}{3}$ (c) $\frac{3}{5}$ (d) $\frac{4}{5}$
-
- 13 The straight line passing through (2 , 1) , (4 , 0) is parallel to the straight line whose equation is
 (a) $2X + y = 1$ (b) $y = \frac{1}{2}X + 3$ (c) $X + 2y = 5$ (d) $2X + 3y = 3$
-
- 14 If $AB = 5$ length units , A (4 , - 1) , then B could be
 (a) (- 1 , 4) (b) (2 , 1) (c) (1 , 3) (d) (5 , 0)
-

15 In the opposite figure :

OABC is a square of side length 4 cm.

, then the equation of $\overleftrightarrow{AC}$ is

- (a) $y = X + 4$ (b) $y = X - 4$
 (c) $y = -X + 4$ (d) $X = 4y + 4$



- 16 If ΔABC is right-angled at B , then $\sin C + \cos C \dots\dots\dots 1$

- (a) = (b) > (c) < (d) $\leq$

Trigonometry and Geometry

- 17 The sum of measures of the accumulative angles at a point equals
(a) 90° (b) 180° (c) 270° (d) 360°
-
- 18 $\overline{AB}$ is a diameter in a circle whose centre is M (2, -1), if A (-2, 3), then B =
(a) (0, 1) (b) (0, 2) (c) (2, -2) (d) (6, -5)
-
- 19 If $\triangle ABC$ is right-angled at B, $2 AB = \sqrt{3} AC$, then $m(\angle C) =$
(a) 30° (b) 45° (c) 60° (d) 75°
-
- 20 The straight line whose equation is : $2x - 3y = 6$ cuts from the negative part of the y-axis a part of length units.
(a) 6 (b) 2 (c) -3 (d) 3
-
- 21 If $\cos 70^\circ = \sin X$ where X is the measure of an acute angle, then $X =$
(a) 60° (b) 45° (c) 30° (d) 20°

Second Essay questions

- 22 Prove that : $\sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$
-
- 23 Prove that the points A (-3, -1), B (6, 5), C (2, 4), D (-7, -2) are the vertices of a parallelogram.
-
- 24 Find the equation of the straight line whose slope = 2 and passes through the point (1, 3)

Exam 5

First Multiple choice questions

Choose the correct answer from those given :

- 1 The equation of the y-axis is
(a) $x = 0$ (b) $y = 0$ (c) $x = y$ (d) $y = 1$
-
- 2 If C (x, 1) is the midpoint of $\overline{AB}$ where A (5, y), B (3, 3), then $x + y =$
(a) 5 (b) 3 (c) -1 (d) 4
-
- 3 The angle whose measure is 30° supplements an angle of measure
(a) 60° (b) 120° (c) 150° (d) 180°
-
- 4 If $\sin X = \frac{1}{2}$ where X is the measure of an acute angle, then $\tan (X + 15^\circ) =$
(a) 1 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) -1

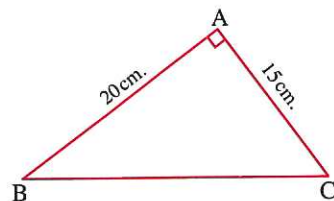
- 5 ABCD is a parallelogram , its diagonals intereseect at M where A (3 , - 1) , C (1 , 7) , then the point M is

(a) (3 , 1) (b) (2 , 3) (c) (3 , 2) (d) (1 , 3)

- 6 In the opposite figure :

$$\cos C \cos B - \sin C \sin B = \dots\dots\dots$$

(a) 0 (b) 1
(c) $\frac{3}{5}$ (d) $\frac{4}{5}$



- 7 A circle its centre is the origin point and its radius length is 2 length units. Which of the following points lies on the circle ?

(a) (1 , 2) (b) (- 2 , 1) (c) $(\sqrt{3} , 1)$ (d) $(\sqrt{2} , 1)$

- 8 The slope of the straight line which makes an angle of measure 45° with the positive direction of the X-axis is

(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$ (c) 1 (d) - 1

- 9 The equation of the straight line which passes through (2 , - 1) and is parallel to the X-axis is

(a) $X = 2$ (b) $y = 2$ (c) $X = - 1$ (d) $y = - 1$

- 10 The image of the point (3 , 2) by reflection in the origin point is

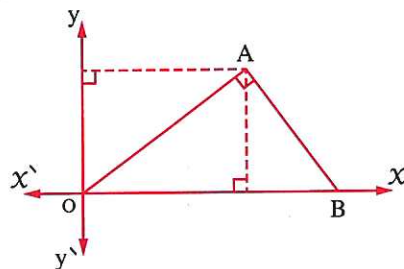
(a) (- 3 , - 2) (b) (- 3 , 2) (c) (3 , - 2) (d) (2 , 3)

- 11 In the opposite figure :

ΔABO is right-angled at A , A (6 , 3)

, then $\tan (\angle AOB) = \dots\dots\dots$

(a) 2 (b) $\frac{1}{2}$
(c) $\frac{\sqrt{3}}{2}$ (d) $-\frac{1}{2}$



- 12 The distance between the two points (3 , 2) , (- 1 , 5) is length units.

(a) 4 (b) 5 (c) 6 (d) $5\sqrt{2}$

- 13 $\sin 30^\circ \cos 60^\circ = \dots\dots\dots$

(a) $\frac{\sqrt{3}}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{2}$ (d) $2\sqrt{3}$

Trigonometry and Geometry

14 The straight line whose equation is : $y - x = 3$ makes an angle with the positive direction of the x -axis of measure

- (a) 45° (b) 30° (c) 60° (d) 135°

15 If $\cos x = \sin 30^\circ \tan 45^\circ$ where x is the measure of an acute angle , then $x = \dots\dots\dots$

- (a) 30° (b) 60° (c) 90° (d) 180°

16 If m_1 and m_2 are the slopes of two parallel straight lines , then

- (a) $m_1 m_2 = 2$ (b) $m_1 m_2 = 1$ (c) $m_1 - m_2 = 0$ (d) $m_1 m_2 = -1$

17 If $\triangle ABC$ is right-angled at B , $AB = 3 BC$, then $\tan C = \dots\dots\dots$

- (a) 3 (b) $\frac{1}{3}$ (c) $\frac{3}{\sqrt{10}}$ (d) $\frac{1}{\sqrt{10}}$

18 The number of the axes of symmetry of the equilateral triangle is

- (a) 0 (b) 1 (c) 2 (d) 3

19 The straight line whose equation is : $\frac{x}{2} - \frac{y}{3} = 6$ cuts from the positive part of the x -axis a part of length units.

- (a) 3 (b) 12 (c) 6 (d) 18

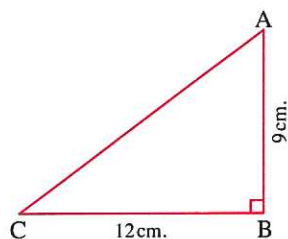
20 The straight line whose equation is : $2x + y - 2 = 0$ is perpendicular to the straight line whose equation is

- (a) $y = 2x + 2$ (b) $2y - x = 3$ (c) $y = 2x$ (d) $2x + 3y = 0$

21 In the opposite figure :

$\sin A \cos C + \cos A \sin C = \dots\dots\dots$

- (a) 1 (b) $\frac{1}{2}$
(c) $\frac{3}{5}$ (d) $\frac{4}{5}$



Second Essay questions

22 Find the value of x where : $\sin x = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$, $0^\circ < x < 90^\circ$

23 Prove that the points A (3 , - 1) , B (- 4 , 6) , C (2 , - 2) lie on one circle whose centre is M (- 1 , 2)

24 Find the equation of the straight line which passes through (1 , 3) and is perpendicular to the straight line : $x + 3y = 4$

حمل الآن

مجانا وحصريا

امتحانات رقم (3)

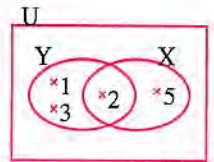
الترم الاول



4 [a] From the opposite figure, find :

1 X and Y

2 $X \times (X \cap Y)$



[b] Find the middle proportional of the two quantities : $2a^2$, $8b^2$

5 [a] Graph the curve of the function $f : f(X) = 4 - X^2$, where $X \in [-2, 2]$ and from the graph find :

1 The coordinates of the vertex of the curve.

2 The maximum or minimum value of the function.

[b] If $\frac{X}{a+b-c} = \frac{y}{a-b+c} = \frac{z}{b-a+c}$, prove that : $\frac{X+y}{a} = \frac{y+z}{c}$

2

Giza Governorate



Answer the following questions :

1 Choose the correct answer :

1 If $3^{X+1} = 81$, then $2X = \dots\dots\dots$

(a) 4

(b) 6

(c) 7

(d) 3

2 If $n(X) = 2$, $n(X \times Y) = 6$, then $n(Y^2) = \dots\dots\dots$

(a) 4

(b) 9

(c) 16

(d) 12

3 If $X^2 = 4$, then $|X| = \dots\dots\dots$

(a) ± 2

(b) 2

(c) -2

(d) 4

4 If $Xy = 7$, then $y \propto \dots\dots\dots$

(a) $\frac{1}{X}$

(b) $X-7$

(c) X

(d) $X+7$

5 If $X - y = 5$, then $6X - 6y = \dots\dots\dots$

(a) 30

(b) 11

(c) 1

(d) -1

6 The commonest measure of dispersion and the most accurate is the $\dots\dots\dots$

(a) arithmetic mean.

(b) median.

(c) standard deviation.

(d) mode.

2 [a] If $X = \{-1, 0, 1, 2, 3\}$, $Y = \{0, 1, 4, 6, 9\}$ and R is a relation from X to Y where "aRb" means " $a^2 = b$ " for each $a \in X$ and $b \in Y$

1 Write R and represent it by an arrow diagram.

2 Prove that R is a function from X to Y and find the range of it.

[b] If a, b, c and d are proportional quantities, prove that : $\frac{ac}{db} = \left(\frac{a-c}{b-d}\right)^2$

- 3 [a]** If $y \propto X$ and $y = 14$, when $X = 42$
, find : **[1]** The relation between X and y
[2] The value of y when $X = 60$
- [b]** Graph the curve of the function $f : f(X) = 4 - X^2$, where $X \in [-3, 3]$
 , from the graph find the vertex of the curve , the maximum value of the function and the equation of the symmetry axis.
-
- 4 [a]** If $f(X) = X - 6$, $\frac{1}{3} f(a) = -2$, **find the value of : a**
- [b]** If $5a = 3b$, **find the value of :** $\frac{7a + 9b}{4a + 2b}$
-
- 5 [a]** If $(X - 1, 11) = (8, y + 3)$, **find the value of :** $\sqrt{X + 2y}$
- [b]** **Find the standard deviation of the values :** 16 , 32 , 56 , 20 , 27

3

Alexandria Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

- [1]** $\sqrt[3]{125} = \sqrt{\dots\dots\dots}$
 (a) 25 (b) 35 (c) 10 (d) 15
- [2]** The is the square root of the mean of the squares of the deviations of the values from their mean.
 (a) mode (b) median
 (c) standard deviation (d) mean
- [3]** If $(2, y^3 + 1) = (2, 65)$, then $y = \dots\dots\dots$
 (a) 6 (b) - 8 (c) 8 (d) 4
- [4]** If a, b, c and d are in continued proportion , and $a + b + c = 5$, $b + c + d = 7$
 , then $\frac{a}{b} = \dots\dots\dots$
 (a) $\frac{5}{7}$ (b) $\frac{7}{5}$ (c) $-\frac{5}{7}$ (d) $-\frac{7}{5}$
- [5]** The solution set of the equation $4X^2 = 9$ in $\mathbb{R}$ is
 (a) $\left\{\frac{3}{2}\right\}$ (b) $\left\{\frac{3}{2}, -\frac{3}{2}\right\}$ (c) $\{2.5\}$ (d) $\{7\}$
- [6]** If $3^{n+1} = \frac{1}{81}$, then $n = \dots\dots\dots$
 (a) - 4 (b) - 5 (c) - 3 (d) 3

- 2 [a]** If $X = \{1, 2, 3\}$, $Y = \{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{5}\}$ and R is a relation from X to Y where " aRb " means " a is the multiplicative inverse of b " for each $a \in X$, $b \in Y$, write R and represent it by an arrow diagram. Is R a function ? And why ?

- [b]** Represent graphically the function f where $f(x) = 4 - x^2$, $x \in \mathbb{R}$, consider $x \in [-3, 3]$ and from the graph deduce the coordinates of the vertex of the curve , the maximum value of the function and the equation of the symmetry axis.

- 3 [a]** If $X = \{3, 4\}$, $Y = \{4, 5\}$, $Z = \{5, 6\}$, find :

[1] $X \times Y$

[2] $X \times (Y \cap Z)$

- [b]** If $f(x) = x^2 - x + 3$, find : $f(0)$, $f(-2)$, $f(\sqrt{3})$

- 4 [a]** If $5a = 3b$, find the value of : $\frac{7a+9b}{4a+2b}$

- [b]** If $\frac{x}{2a+b} = \frac{y}{2b-c} = \frac{z}{2c-a}$, prove that : $\frac{2x+y}{4a+4b-c} = \frac{2x+2y+z}{3a+6b}$

- 5 [a]** If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 2$

, find : **[1]** The relation between x , y

[2] The value of y when $x = 1.5$

- [b]** The following frequency distribution shows the number of children of 100 families in a city :

Number of children	0	1	2	3	4	5	Total
Number of families	3	16	17	25	20	19	100

Calculate the mean and the standard deviation.

4 El-Kalyoubia Governorate



Answer the following questions :

- 1** Choose the correct answer from the given ones :

[1] $\sqrt{(-8)^2 + (-6)^2} = \dots\dots\dots$

(a) -14

(b) -10

(c) 10

(d) 14

- [2]** If 18 is the greatest value of a set of individuals and the range = 6 , then the smallest value is

(a) 8

(b) 12

(c) 14

(d) 36

- [3]** The relation which represents direct variation between x and y is

(a) $xy = 7$

(b) $y = 4 - x$

(c) $\frac{x}{2} = \frac{y}{3}$

(d) $\frac{x}{4} = \frac{5}{y}$

- 4 If $n(X \times Y) = 6$ and $Y = \{2\}$, then $n(X^2) = \dots\dots\dots$
 (a) 4 (b) 9 (c) 16 (d) 36
- 5 If $f(X) = 5$, then $f(-5) = \dots\dots\dots$
 (a) -5 (b) -10 (c) 25 (d) 5
- 6 If $\frac{x}{5} = \frac{y}{4} = \frac{x+2y}{k}$, then $k = \dots\dots\dots$
 (a) 5 (b) 9 (c) 13 (d) 18

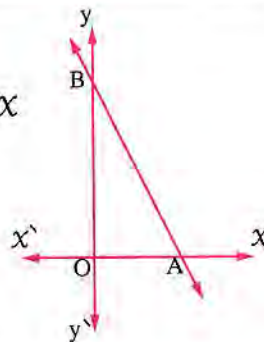
- 2 [a] If $a, 2, 4$ and b are in continued proportion, find the value of each of : a and b
- [b] If $X = \{2, 3, 5\}$, $Y = \{2, 4, 6, 8\}$ and R is a relation from X to Y where " aRb " means " $b = 2a$ " for each $a \in X, b \in Y$, write R and represent it by an arrow diagram and show if R is a function from X to Y or not.

- 3 [a] If $\frac{a}{b} = \frac{2}{3}$, find the value of : $\frac{3a-b}{2a+b}$

- [b] The opposite figure represents the function f where $f(X) = 4 - 2X$

Find : 1 The coordinates of each of A and B

2 The area of the triangle AOB



- 4 [a] If a, b, c, d are proportional quantities, prove that : $\frac{a+2c}{b+2d} = \frac{a-c}{b-d}$
- [b] If $y \propto x$ and $y = 14$ when $x = 42$
 find : 1 The relation between y and x 2 The value of y when $x = 60$

- 5 [a] Represent graphically the curve of the function $f : f(x) = 2 - x^2$ where $x \in [-2, 2]$ and from the graph deduce the equation of the axis of symmetry and the maximum value of the function.

- [b] Calculate the standard deviation for the following values :
 16, 32, 5, 20, 27

5

El-Sharkia Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- 1 If $(125, \sqrt{y}) = (x^3, 4)$, then $x + y = \dots\dots\dots$

(a) 15 (b) 21 (c) 7 (d) 10

2 If $2a + 3b = \text{zero}$, then $\frac{a}{b} = \dots\dots\dots$

(a) $\frac{-3}{2}$

(b) $\frac{-2}{3}$

(c) $\frac{3}{2}$

(d) $\frac{2}{3}$

3 If $3^{X+1} = 12$, then $3^X = \dots\dots\dots$

(a) 3

(b) 2

(c) 5

(d) 4

4 If the range of the values 7, a, 8, 9, 5 is 7, then a = $\dots\dots\dots$

(a) 1

(b) 2

(c) 3

(d) 4

5 If $\frac{X}{3} = \frac{5}{y}$, then $X \propto \dots\dots\dots$

(a) y^2

(b) y

(c) $\frac{1}{y}$

(d) 5y

6 If the point (X, y) lies on the second quadrant, then the point $(-X, y^2)$ lies on the $\dots\dots\dots$ quadrant.

(a) first

(b) second

(c) third

(d) fourth

2 [a] If $X = \{-2, -1, 0, 2\}$, $Y = \{-3, 1, 5, 2\}$ and R is a relation from X to Y where "aRb" means " $b = a^2 + 1$ " for each $a \in X$ and $b \in Y$, write R, represent it by an arrow diagram, then show if R is a function or not, why? and if R is a function find its range.

[b] If $\frac{2X+3}{y+2} = \frac{3}{2}$, find : The ratio of $\frac{X}{y}$, and the numerical value of $\frac{X+2y}{3y}$

3 [a] If $X = \{3, 4\}$, $Y = \{4, 5\}$, $Z = \{3, 5\}$

, find : 1 $(X - Z) \times Y$

2 $n[(Z \cap Y) \times X]$

[b] Find the positive number which if its square is added to the first term of the ratio 29 : 46 and subtracted from the second term of the ratio, we will get the ratio $\frac{3}{2}$

4 [a] If 4, a, $\frac{1}{9b^2}$ are in continued proportion, find : the values of a b

[b] Calculate the arithmetic mean and the standard deviation for the values : 3, 6, 7, 11, 13

5 [a] If $y \propto X$ and $y = 8$ when $X = 4$

, find : 1 The relation between X, y

2 The value of X when $y = \frac{1}{2}$

[b] Represent the curve of the function $f : f(X) = -X^2 - 2X$ where $X \in [-4, 2]$

From the graph, deduce :

1 The coordinates of the vertex of the curve.

2 The equation of the line of symmetry.

3 The maximum value or the minimum value of the function.



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 If $(X - 1)$ is the multiplicative inverse of the number $\frac{1}{3}$, then $X = \dots\dots\dots$

- (a) $\frac{2}{3}$ (b) $1\frac{1}{3}$ (c) 3 (d) 4

2 If $(a + b)^2 = 49$, $a b = 7$, then $a^2 + b^2 = \dots\dots\dots$

- (a) 7 (b) 14 (c) 35 (d) 42

3 The number whose half and one-third are prime numbers is $\dots\dots\dots$

- (a) 3 (b) 6 (c) 12 (d) 18

4 If $\sum (X - \bar{X})^2 = 36$ of a set of values and the number of these values = 9, then $\sigma = \dots\dots\dots$

- (a) 2 (b) 4 (c) 18 (d) 27

5 If $f(X + 2) = X - 2$, then $f(5) = \dots\dots\dots$

- (a) 1 (b) 2 (c) 3 (d) 7

6 If $3a = \frac{5}{6}b$, then $\frac{a}{b} = \dots\dots\dots$

- (a) $\frac{18}{5}$ (b) $\frac{15}{6}$ (c) $\frac{6}{15}$ (d) $\frac{5}{18}$

2 [a] If $X = \{1, 2\}$, $Y = \{1, 4\}$, $Z = \{2, 4, 5\}$

, find : **1** $X \times Y$ **2** $(Y \cap Z) \times X$ **3** $n(Z^2)$

[b] Two integer numbers, the ratio between them is 3 : 7 and if we subtracted 5 from each term, the ratio between them becomes 1 : 3, find the two numbers.

3 [a] If $X = \{-1, 0, 1, 2, 3\}$, $Y = \{0, 1, 4, 6, 9\}$ and R is a relation from X to Y where " aRb " means " $a^2 = b$ " for all $a \in X$, $b \in Y$, write R and represent it by an arrow diagram. Show that R is a function from X to Y and find its range.

[b] If a, b, c and d are proportional quantities, prove that : $\frac{a}{b} \cdot \frac{c}{d} = \left(\frac{a-c}{b-d}\right)^2$

4 [a] If y varies inversely as X, and $y = 3$ when $X = 2$

, find : **1** The relation between y and X **2** The value of y when $X = 1.5$

[b] If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - 2b + 5c}{3X}$, find : the value of X

- 5 [a] Represent graphically the function $f : f(X) = (X - 3)^2$, taking $X \in [0, 6]$ and from the graph, find :

1 The equation of the symmetry axis.

2 The minimum value of the function.

- [b] The following frequency distribution shows the number of the defective units found in 100 boxes of manufactured units :

Number of defective units (X)	zero	1	2	3	4	Total
Number of boxes (k)	8	16	50	20	6	100

Find the standard deviation of the defective units.

7

El-Dakahlia Governorate



Answer the following questions : (Calculator is permitted)

- 1 [a] Choose the correct answer :

1 30 % of 600 =

(a) 1.8

(b) 18

(c) 180

(d) 1800

2 If $(X + 1, 2) = (5, y - 3)$, then $\sqrt{X + y} = \dots\dots\dots$

(a) 2

(b) 3

(c) 6

(d) 9

3 If X, Y are two sets where $n(X \times Y) = 11$, then $n(X) + n(Y) = \dots\dots\dots$

(a) 8

(b) 9

(c) 11

(d) 12

[b] If a, b, c, d are in continued proportion, prove that : $\frac{c^2 - d^2}{a - c} = \frac{b \cdot d}{a}$

- 2 [a] Choose the correct answer :

1 The range of the values : $X + 4$, $X - 3$, $X + 8$, where X is a real number is

(a) 1

(b) 4

(c) 7

(d) 11

2 If a, 5, b, 7 are proportional quantities, then $\frac{a}{b} = \dots\dots\dots$

(a) $\frac{5}{7}$

(b) $\frac{7}{5}$

(c) 5

(d) 7

3 If the real length is 6 m., the length in drawing is 6 cm., then the drawing scale is

(a) 1 : 1

(b) 1 : 10

(c) 1 : 100

(d) 1 : 1000

[b] If $X \times Y = \{(3, 2), (1, 2), (2, 4), (3, 4), (1, 4), (2, 2)\}$

, find : 1 X, Y

2 $(X - Y) \times (X \cap Y)$

- 3 [a]** If $X = \{1, 3, 4, 5\}$, $Y = \{1, 2, 3, 4, 5, 6\}$ and R is a relation from X to Y where " aRb " means " $a + b = 7$ " for each $a \in X$, $b \in Y$

[1] Write R and represent it with an arrow diagram.

[2] Show if R is a function or not , and why ? If it is a function , find its range.

- [b]** If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{2}{3}$, and $5a - 3c + e = 18$, **find the value of : $5b - 3d + f$**

- 4 [a]** If $f : f(x) = kx^2 + (3k + 2)x + 6$ and the x -coordinate of the vertex of the curve is -2 , **find :** **[1]** The value of k **[2]** The minimum or maximum value of the function f

- [b]** The number of hours (n) needed for carrying out a work varies inversely as the number of workers (x) who carry out this work. If the work is carried out by 6 workers within 4 hours , what is the needed time for carrying out the work by 8 workers ?

- 5 [a]** Calculate the standard deviation of the values : 12 , 13 , 16 , 18 , 21

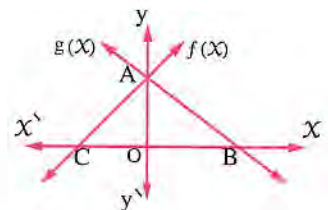
- [b]** In the opposite figure :

$\overrightarrow{AC}$ represents the linear function $f : f(x) = x + 3$

, $\overrightarrow{AB}$ represents the linear function $g : g(x) = mx + k$

If the length of $\overline{BC} = 7$ length units , **find :**

- [1]** The value of each of k , m **[2]** $g(8)$



8

Port Said Governorate Model (1)



Answer the following questions :

- 1** Choose the correct answer from those given :

[1] $\sqrt{50} - \sqrt{8} = \dots\dots\dots$

(a) $\sqrt{42}$

(b) $\sqrt{58}$

(c) $3\sqrt{2}$

(d) $2\sqrt{5}$

[2] If $X = \{2\}$, then $X^2 = \dots\dots\dots$

(a) 4

(b) $\{4\}$

(c) (2 , 2)

(d) $\{(2 , 2)\}$

[3] $f : f(x) = x^4 - 2x^3 + 7$ is a polynomial function of the degree.

(a) first

(b) second

(c) third

(d) fourth

[4] If 3 , 6 and x are proportional quantities , then $x = \dots\dots\dots$

(a) 9

(b) 12

(c) 15

(d) 18

- 5 The range of the set of values 7, 3, 6, 9, 5 is
 (a) 3 (b) 4 (c) 6 (d) 12
- 6 If $\frac{x}{5} = \frac{y}{4} = \frac{x+2y}{k}$, then $k =$
 (a) 8 (b) 9 (c) 13 (d) 14
- 7 The relation which represent direct variation between y and x is
 (a) $xy = 5$ (b) $y = x^2 + 3$ (c) $\frac{x}{3} = \frac{4}{y}$ (d) $\frac{x}{5} = \frac{y}{3}$
- 8 If $(1, 2) \in \{(1, x), (3, 4)\}$, then $x =$
 (a) 1 (b) 2 (c) 3 (d) 4
- 9 $f(x) = 5$ is represented by a straight line that is parallel to x -axis and passes through the point
 (a) $(0, 5)$ (b) $(5, 0)$ (c) $(5, -5)$ (d) $(0, 0)$
- 10 If $y \propto x$ and $x = 1$ when $y = 4$, then the variation constant =
 (a) 4 (b) 3 (c) 2 (d) 1
- 11 If $\frac{a}{b} = \frac{2}{3}$, then $3a - 2b =$
 (a) 3 (b) 2 (c) 1 (d) zero
- 12 If $xy = 5$, then y varies inversely as
 (a) x (b) $\frac{1}{x}$ (c) $\frac{5}{x}$ (d) $5 + x$
- 13 If $\frac{a}{b} = \frac{b}{c} = 2$, then $\frac{a}{c} =$
 (a) 2 (b) 4 (c) 6 (d) 8
- 14 The S.S. of the equation: $x^2 + 9 = 0$ where $x \in \mathbb{R}$ is
 (a) $\{-3\}$ (b) $\{3\}$ (c) $\{-3, 3\}$ (d) $\emptyset$
- 15 If $X \times Y = \{(1, 2), (3, 2)\}$, then $Y =$
 (a) $\{1, 2\}$ (b) $\{3, 2\}$ (c) $\{2\}$ (d) $\{1, 3\}$
- 16 If $f(x) = x + b$, $f(3) = 7$, then $b =$
 (a) 10 (b) 7 (c) 4 (d) 3
- 17 If $y \propto x$, $y \propto \frac{1}{z}$, then $y \propto$
 (a) $\frac{x}{z}$ (b) $\frac{z}{x}$ (c) xz (d) $x + z$
- 18 The point $(-2, -3)$ lies on the quadrant.
 (a) first (b) second (c) third (d) fourth
- 19 If $n(X) = 3$, $n(X \times Y) = 6$, then $n(Y) =$
 (a) 2 (b) 3 (c) 6 (d) 9

20 If $\frac{a}{b} = \frac{c}{d} = \frac{3}{5}$, then $\frac{a+c}{b+d} = \dots\dots\dots$

(a) $\frac{5}{3}$

(b) $\frac{3}{5}$

(c) $\frac{6}{5}$

(d) $\frac{5}{6}$

21 If $a, b, 2, 3$ are proportional quantities, then $\frac{b}{a} = \dots\dots\dots$

(a) $\frac{3}{2}$

(b) $\frac{2}{3}$

(c) $\frac{1}{3}$

(d) $\frac{1}{2}$

2 Draw the curve of the function $f : f(x) = x^2 - 1$ where $x \in [-2, 2]$

and from the graph, find : 1 The minimum value of the function.

2 The equation of the symmetry axis of the curve.

3 If $y \propto \frac{1}{x}$ and $y = 3$ when $x = 4$, find the value of y when $x = 6$

4 Calculate the standard deviation of the values : 1, 3, 5, 7, 9

9

Kafr El-Sheikh Governorate



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

1 The point $(-3, -4)$ lies on the quadrant.

(a) first

(b) second

(c) third

(d) fourth

2 If $2^{x-1} = 8$, then $x = \dots\dots\dots$

(a) 2

(b) 3

(c) 4

(d) 5

3 One of the measures of the dispersion is

(a) the mean.

(b) the median.

(c) the mode.

(d) the standard deviation.

4 If $x = 3$, $y = 4$, then $\sqrt{x^2 + y^2} = \dots\dots\dots$

(a) 5

(b) -5

(c) 7

(d) -7

5 If $xy = 7$, then $y \propto \dots\dots\dots$

(a) x

(b) $\frac{1}{x}$

(c) $7x$

(d) $\frac{x}{7}$

6 $\frac{1}{3}$ of the number $3^{12} = \dots\dots\dots$

(a) 1

(b) 3^4

(c) 3^{11}

(d) 3^{13}

- 2 [a] If $X = \{2, 3, 4\}$ and $Y = \{3, 4, 5, 6, 8\}$, R is a relation from X to Y where " aRb " means " $a = \frac{1}{2}b$ " for each $a \in X, b \in Y$

[1] Write R and represent it by an arrow diagram.

[2] Prove that R is a function, mention its range.

- [b] If $\frac{x}{y} = \frac{2}{3}$, find the value of : $\frac{6y - x}{3x + 2y}$

- 3 [a] If a, b, c, d are proportional quantities, prove that : $\frac{a + 2c}{b + 2d} = \frac{3a + c}{3b + d}$

- [b] If $f(x) = 2x + b$ and $f(3) = 10$, find the value of b , then find $f\left(\frac{1}{2}\right)$

- 4 [a] If $y \propto x$ and $y = 8$ when $x = 4$

, find : [1] The relation between x and y

[2] The value of y when $x = 7$

- [b] If b is the middle proportional between a and c , prove that : $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

- 5 [a] Represent graphically the function $f : f(x) = (x + 1)^2, x \in [-4, 2]$ and from the graph deduce :

[1] The coordinates of the vertex of the curve.

[2] The minimum value of the function.

- [b] Calculate the standard deviation of the set of values : 3, 6, 7, 9 and 15

10

Beni Suef Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- [1] If $3^m = \frac{1}{27}$, then $m = \dots\dots\dots$

(a) -1

(b) -2

(c) -3

(d) -4

- [2] If the point $(a + 1, a - 2)$ lies in the first quadrant, then $a \dots\dots\dots 2$

(a) =

(b) $\leq$

(c) $<$

(d) $>$

- [3] $\{2\} \subset \dots\dots\dots$

(a) $\{2, 5\}$

(b) $[2, 5]$

(c) $(2, 5)$

(d) $\{52\}$

- [4] If 5 is the smallest value of a set of individuals and the range equals 7, then the greatest value of this set is $\dots\dots\dots$

(a) 7

(b) 10

(c) 12

(d) 14

5 If $a + b = a b = 5$, then $a^2 b + a b^2 = \dots\dots\dots$

(a) 30

(b) 25

(c) 15

(d) 10

6 If $\frac{a}{b} = \frac{b}{c} = \frac{c}{3} = 2$, then $a = \dots\dots\dots$

(a) 54

(b) 24

(c) 18

(d) 6

2 [a] If $X = \{2\}$, $Y = \{1, 2, 3, 4\}$, $Z = \{3, 4, 5\}$

, find : 1 $n(Z^2)$

2 X^2

3 $(Y \cap Z) \times X$

[b] If a, b, c and d are proportional quantities , prove that : $\frac{a+b}{b} = \frac{c+d}{d}$

3 [a] If $X = \{2, 3, 4\}$ and R is a relation on X where " aRb " means " $a - b = \text{zero}$ " for each $a \in X, b \in X$, write R and represent it by an arrow diagram , and if the relation is a function state its range.

[b] If $\frac{X+2y}{3X-2y} = \frac{3}{2}$, then find the value of : $X : y$

4 [a] If $\frac{a+b}{5} = \frac{b+c}{3} = \frac{c+a}{6}$, prove that : $\frac{a+b+c}{a} = \frac{7}{4}$

[b] Calculate the arithmetic mean and the standard deviation of the following data :
3 , 6 , 7 , 9 and 15

5 [a] If the increase in the sea water level (y) is directly proportional with the increase in the Earth's temperature (X) , if the Earth's temperature rises by one degree celsius the sea water level increases by 1.4 metre , find the relation between y and X , then find the expected increase in the sea water level if the Earth's temperature increased by 2.5 degree celsius.

[b] Represent graphically the function f where $f(X) = X^2 + 2X + 1$, taking $X \in [-3, 1]$ and from the graph deduce :

1 The equation of the axis of symmetry.

2 The minimum value of the function.

11

Assiut Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer :

1 The range of the set of the values 4 , 5 , 7 , 10 and 12 is

(a) 2

(b) 5

(c) 7

(d) 8

2 $[7, 10] - \{7, 10\} = \dots\dots\dots$

- (a) $[7, 10[$ (b) $]7, 10]$ (c) $]7, 10[$ (d) $[7, 10]$

3 If the point $(X - 4, 2 - X)$ where $X \in \mathbb{Z}$ is located in the third quadrant, then $X = \dots\dots\dots$

- (a) 2 (b) 3 (c) 4 (d) 6

4 If $5^X = 1$, then $2^{X+2} = \dots\dots\dots$

- (a) $\frac{1}{4}$ (b) 4 (c) 8 (d) 10

5 If y varies directly with X , and $X = 3$ when $y = 2$, then the constant proportional = $\dots\dots\dots$

- (a) $\frac{2}{3}$ (b) 2 (c) 3 (d) 6

6 If $\frac{7}{3} \times X = \frac{14}{3}$, then $X = \dots\dots\dots$

- (a) 1 (b) 2 (c) 3 (d) 4

2 [a] If $X = \{2, 5, 6\}$, $Y = \{2, 3\}$

, find : 1 $n(X \times Y)$ 2 $Y \times X$ 3 $(X \cap Y) \times Y$

[b] If $\frac{X-2y}{2X+y} = \frac{1}{3}$, find in the simplest form : $\frac{X}{y}$

3 [a] If $X = \{1, 4, 7\}$, $Y = \{1, 3, 4, 6\}$, and R is a relation from X to Y

where " aRb " means " $a = b$ " for each $a \in X, b \in Y$

1 Write R , and represent it by an arrow diagram.

2 Is R a function or not? Mention the reason.

[b] If $y \propto \frac{1}{X}$ and $y = 4$ when $X = 2$

, find : 1 The relation between y, X 2 The value of y when $X = 8$

4 [a] Represent graphically the function $f : f(X) = X^2$, consider $X \in [-2, 2]$

, from the graph deduce :

1 The point of the vertex of the curve.

2 The maximum value or the minimum value of the function.

3 The equation of the axis of symmetry.

[b] If a, b, c and d are proportional quantities, prove that : $\frac{a+b}{b} = \frac{c+d}{d}$

5 [a] If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a-b+5c}{3x}$, then find : the value of x

[b] Find the arithmetic mean and the standard deviation of the set of the values :
12 , 13 , 16 , 18 and 21

12

Qena Governorate



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

[1] If $X = \{1, 2\}$, $Y = \{3, 4\}$, then $(3, 4) \in \dots\dots\dots$

(a) $X \times Y$ (b) $Y \times X$ (c) X^2 (d) Y^2

[2] If $\sqrt[3]{27} = \sqrt{x}$, then $x = \dots\dots\dots$

(a) 9 (b) -9 (c) 3 (d) -3

[3] If $a, x, b, 2x$ are proportional , then $\frac{a}{b} = \dots\dots\dots$

(a) 2 (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) $\frac{1}{4}$

[4] If $\{2, 7\} = \{x+3, 2\}$, then $x = \dots\dots\dots$

(a) 2 (b) 3 (c) 4 (d) 7

[5] The range of the set of values : 23 , 22 , 15 , 18 , 17 is $\dots\dots\dots$

(a) 8 (b) 18 (c) 19 (d) 23

[6] 20 % of 500 L.E. = $\dots\dots\dots$ L.E.

(a) 20 (b) 120 (c) 200 (d) 100

2 [a] If $X = \{-2, -1, 0, 1, 2\}$ and R is a relation on X where " aRb " means " $a + b = \text{zero}$ " for each $a \in X, b \in X$, write R and represent it by an arrow diagram , and show that R is a function , write its range.

[b] If $\frac{x}{y} = \frac{2}{5}$, find the value of : $\frac{3x-y}{2y-3x}$

3 [a] If the function $f : f(x) = ax^2 + 5x + 4$ is a linear function
 , find : [1] The value of a [2] $f(-2)$

[b] If b is the middle proportional between a and c , prove that : $\sqrt{\frac{a^2 + b^2}{b^2 + c^2}} = \frac{a}{b}$
 , where a, b and c are positive numbers.

4 [a] If a, b, c, d are proportional quantities , prove that : $\frac{a+2c}{b+2d} = \frac{3a+c}{3b+d}$

[b] Represent graphically the curve of the function f where $f(x) = (x-2)^2$ on the interval $[-1, 5]$, from the graph find :

- [1] The point of the vertex of the curve.
- [2] The equation of the line of symmetry.
- [3] The maximum or minimum value.

5 [a] If $y \propto x$, and $y = 12$ when $x = 4$

- , find :
- [1] The relation between x and y .
 - [2] The value of x when $y = 36$

[b] The following frequency distribution shows the number of days of the students absentees in a class :

Number of absence days (x)	0	1	2	3	4	Total
Number of students (frequency)	5	7	7	5	6	30

Calculate the mean and the standard deviation.

13

Aswan Governorate



Answer the following questions : (Calculators are allowed)

1 Choose the correct answer from those given :

[1] If $\left(\frac{1}{2}\right)^x = 8$, then $x = \dots\dots\dots$

- (a) $\frac{1}{2}$ (b) 2 (c) -3 (d) 3

[2] If $(x, y-3) = (3, 1)$, then $\sqrt{x^2 + y^2} = \dots\dots\dots$

- (a) 2 (b) 3 (c) 4 (d) 5

[3] The range of the values : 3, 5, 7, 9 is $\dots\dots\dots$

- (a) 6 (b) 7 (c) 8 (d) 9

[4] The middle proportional between 4 and 9 equals $\dots\dots\dots$

- (a) 6 (b) -6 (c) ± 6 (d) 13

[5] If $a-b=5$, $a+b=3$, then $a^2-b^2 = \dots\dots\dots$

- (a) 15 (b) 8 (c) 2 (d) 1

[6] If $X = \{2\}$, $Y = \{3\}$, then $n(X \times Y) = \dots\dots\dots$

- (a) 1 (b) 2 (c) 3 (d) 6

2 [a] If $X = \{2, 3, 4\}$, $Y = \{2, 4, 6, 9, 16\}$ and R is a relation from X to Y where " aRb " means " $a^2 = b$ " for all $a \in X$, $b \in Y$

[1] Write R

[2] Is R a function? Find its range.

[b] If $y \propto X$ and $y = 6$ when $X = 2$, find :

[1] The relation between X and y

[2] The value of y when $X = \frac{1}{3}$

3 [a] If a , b , c and d are proportional quantities, prove that : $\frac{a+b}{b} = \frac{c+d}{d}$

[b] If $X = \{1, 2, 3\}$, $Y = \{3, 4\}$, find :

[1] $(Y \cap X) \times Y$

[2] $n(X^2)$

4 [a] Find the positive number which if its square is added to the two terms of the ratio $1 : 2$, it becomes $5 : 6$

[b] Represent graphically the curve of the function $f : f(X) = X^2 + 1$, taking $X \in [-2, 2]$ and from the graph deduce :

[1] The vertex point of the curve.

[2] The equation of the axis of symmetry.

5 [a] If y changes inversely with X and $y = 2$ when $X = 3$, find :

[1] The relation between y and X

[2] The value of y when $X = 12$

[b] Calculate the arithmetic mean and the standard deviation of the values :
5, 7, 8, 9, 6

14

North Sinai Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

[1] If $n(X) = 4$, $n(Y) = 5$, then $n(X \times Y) = \dots\dots\dots$

(a) 9

(b) 5

(c) 20

(d) 4

[2] If $2^X = 1$, then $5^X = \dots\dots\dots$

(a) 32

(b) zero

(c) 10

(d) 5

[3] If $X - y = 3$, $X + y = 7$, then $X^2 - y^2 = \dots\dots\dots$

(a) 21

(b) 10

(c) 4

(d) 9

[4] If $Xy = 6$, then $y \propto \dots\dots\dots$

(a) X

(b) $X - 6$

(c) $\frac{1}{X}$

(d) $6X$

5 The range of the values : 7 , 11 , 4 , 9 , 16 is

- (a) 4 (b) 12 (c) 5 (d) 3

6 $[2, 5] - \{2, 5\} = \dots\dots\dots$

- (a) $[2, 5]$ (b) $]2, 5]$ (c) $]2, 5[$ (d) $\{2, 5\}$

2 [a] If $y \propto X$ and $y = 3$ at $X = 9$, find :

1 The relation between y , X

2 The value of y at $X = 12$

[b] If $\frac{a}{5} = \frac{b}{2} = \frac{c}{3}$, prove that : $\frac{a+b-c}{a-b+c} = \frac{2}{3}$

3 [a] If $X = \{4, 9, 16\}$, $Y = \{1, 2, 3, 4, 5\}$ and R is a relation from X to Y where " aRb " means " $a = b^2$ " for each $a \in X$, $b \in Y$

1 Write R and represent it by an arrow diagram.

2 Show that R is a function and find its range.

[b] Find the number which if added to each of the two terms of the ratio 3 : 7 , it becomes 1 : 2

4 [a] If $(X^3 - 1, 4) = (7, y)$, find the value of : $4X - y$

[b] Represent graphically the function $f : f(X) = 2 - X^2$, consider $X \in [-3, 3]$ and from the drawing deduce :

1 The vertex of the curve.

2 The maximum value of the function.

3 The equation of the axis of symmetry.

5 [a] If b is the middle proportional between a , c , prove that : $\frac{a^2 + b^2}{c^2 + b^2} = \frac{a}{c}$

[b] Calculate the standard deviation of the values : 12 , 13 , 16 , 18 , 21

15

Red Sea Governorate



Answer the following questions :

1 Choose the correct answer from the given answers :

1 If $n(X) = 2$, $n(Y) = 9$, then $n(X \times Y) = \dots\dots\dots$

- (a) 6 (b) 7 (c) 11 (d) 18

2 If $2^X = \frac{1}{8}$, then $X = \dots\dots\dots$

- (a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) 3 (d) -3

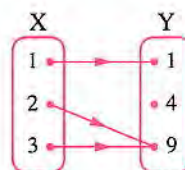
- 3 The middle proportional between 3, 27 is
 (a) 9 (b) ± 9 (c) 81 (d) ± 81
- 4 The multiplicative inverse of the number 0.25 is
 (a) 4 (b) -4 (c) $\frac{1}{4}$ (d) $-\frac{1}{4}$
- 5 The straight line $3x + 8y = 24$ intersects y-axis at the point
 (a) (0, 8) (b) (8, 0) (c) (0, 3) (d) (3, 0)
- 6 The range of the values 7, 3, 6, 9, 5 is
 (a) 3 (b) 4 (c) 6 (d) 12

- 2 [a] If $y \propto x$ and $y = 6$ when $x = 3$, find :

1 The relation between y and x

2 The value of y when $x = 5$

- [b] The opposite arrow diagram represents a relation R from X to Y



1 Write R

2 Is R a function? Why? If it is a function, find its range.

- 3 [a] If b is the middle proportional between a and c , prove that : $\frac{a}{c} = \frac{b^2}{c^2}$

- [b] If $X \times Y = \{(1, 1), (1, 3), (1, 5)\}$, find :

1 X

2 $n(Y^2)$

3 $Y \times X$

- 4 [a] If $\frac{x}{y} = \frac{2}{3}$, find the value of : $\frac{y+2x}{y-x}$

- [b] If a, b, c, d are proportional quantities, prove that : $\frac{3a-2c}{3b-2d} = \frac{5a+3c}{5b+3d}$

- 5 [a] Calculate the mean and the standard deviation of the values : 8, 9, 7, 6, 5

- [b] Represent graphically the function $f : f(x) = x^2 - 4$ where $x \in [-3, 3]$ and from the graph identify :

1 The minimum value.

2 The equation of the axis of symmetry.





1

Cairo Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

- 1** If $\sin H = \frac{1}{2}$, where $\angle H$ is an acute angle, then $m(\angle H) = \dots\dots\dots$
 (a) 30° (b) 45° (c) 60° (d) 90°
- 2** If $\triangle ABC \equiv \triangle XYZ$, $m(\angle A) = 40^\circ$, then $m(\angle X) = \dots\dots\dots$
 (a) 140° (b) 80° (c) 50° (d) 40°
- 3** The distance between the point $(7, 4)$ and y-axis equals $\dots\dots\dots$ length unit.
 (a) -7 (b) -4 (c) 4 (d) 7
- 4** If L_1, L_2 are two straight lines in the same plane and $L_1 \cap L_2 = \emptyset$, then the two straight lines are $\dots\dots\dots$
 (a) intersecting. (b) perpendicular. (c) parallel. (d) coincident.
- 5** If m_1, m_2 are the slopes of two parallel straight lines, then $\dots\dots\dots$
 (a) $m_1 = m_2$ (b) $m_1 m_2 = -1$ (c) $m_1 - m_2 = -1$ (d) $m_1 m_2 = 1$
- 6** The number of altitudes of the isosceles triangle equals $\dots\dots\dots$
 (a) zero. (b) 1 (c) 2 (d) 3

2 [a] ABC is a right-angled triangle at B, where $AB = 8$ cm. and $BC = 6$ cm.

Prove that : $\cos A \cos C = \sin A \sin C$

[b] Find the equation of the straight line which passes through the point $(2, 5)$ and is perpendicular to the straight line whose slope equals $\frac{-1}{2}$

3 [a] If $\overleftrightarrow{AB}$ is parallel to the X-axis, where $A(4, 2)$ and $B(1, k)$, find the value of k

[b] Find the value of : $\sin 30^\circ + \cos 60^\circ + 2 \sin 45^\circ \cos 45^\circ$ (Write the steps)

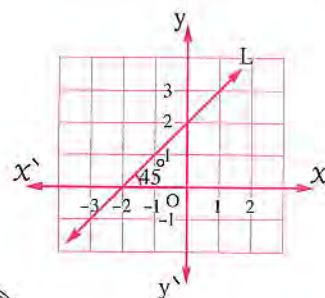
4 [a] Prove that the triangle whose vertices are $A(2, 1)$, $B(-2, 1)$ and $C(0, 4)$ is an isosceles triangle.

[b] If $\tan(X + 5)^\circ = \sin 60^\circ \cos 30^\circ + \sin^2 30^\circ$,
 find the value of X where $(X + 5)^\circ$ is the measure of an acute angle.

5 [a] If $C(3, 4)$ is the midpoint of $\overline{AB}$ where $A(1, 2)$, find the coordinates of the point B

[b] From the opposite figure , find

- 1 The slope of the straight line L
- 2 The length of the y-intercept.
- 3 The equation of the straight line L



2

Giza Governorate



Answer the following questions :

1 Choose the correct answer :

- 1 If $\tan (X + 10^\circ) = \sqrt{3}$ where X is the measure of an acute angle , then $X = \dots\dots\dots$
 (a) 60° (b) 50° (c) 20° (d) 45°
- 2 If $X + y = 5$, $kX + 2y = 0$ are two perpendicular straight lines , then $k = \dots\dots\dots$
 (a) -2 (b) -1 (c) 1 (d) 2
- 3 If the two adjacent angles are complementary , then the outer sides of them are $\dots\dots\dots$
 (a) parallel. (b) including an acute angle.
 (c) perpendicular. (d) collinear.
- 4 ABCD is a parallelogram , $m(\angle A) + m(\angle C) = 200^\circ$, then $m(\angle B) = \dots\dots\dots$
 (a) 50° (b) 80° (c) 100° (d) 160°
- 5 The perpendicular distance between the two straight lines $X - 2 = 0$ and $X + 3 = 0$ equals $\dots\dots\dots$ length units.
 (a) 1 (b) 5 (c) 2 (d) 3
- 6 ABC is a triangle , $(AC)^2 > (AB)^2 + (BC)^2$, then $\angle A$ is $\dots\dots\dots$
 (a) obtuse. (b) right. (c) reflex. (d) acute.

2 [a] If ABCD is a trapezium , $\overline{AD} \parallel \overline{BC}$, $m(\angle B) = 90^\circ$, $AB = 3$ cm. , $AD = 6$ cm. and $BC = 10$ cm. , prove that :

$$\cos (\angle DCB) - \tan (\angle ACB) = \frac{1}{2}$$

[b] If the straight line L_1 passes through the two points $(3, 1)$, $(2, k)$ and the straight line L_2 makes an angle of measure 45° with the positive direction of X -axis , find the value of k if $L_1 \perp L_2$

3 [a] Without using the calculator , prove that :

$$\tan^2 60^\circ - \tan^2 30^\circ = (1 + \tan 60^\circ \tan 30^\circ) \div \cos^2 30^\circ$$

[b] Find the equation of the straight line which passes through the point (3 , - 5) and is parallel to the straight line $X + 2 y - 7 = 0$

4 [a] If the point C (6 , - 4) is the midpoint of $\overline{AB}$, where A (5 , - 3) , find the point B

[b] Find the measure of the angle A where $\angle A$ is an acute angle if :

$$\sin A = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$$

5 [a] Prove that the points A (- 1 , 1) , B (0 , 5) , C (4 , 2) and D (5 , 6) are the vertices of a parallelogram.

[b] Find the slope and the intercepted part of y-axis by the straight line $5 X + 4 y - 10 = 0$

3

Alexandria Governorate



Answer the following questions : (Calculators are permitted)

1 Choose the correct answer from those given :

[1] The number of axes of symmetry of the isosceles triangle is

- (a) 3 (b) 2 (c) 1 (d) 0

[2] If the distance between the two points (a , 7) , (- 2 , 3) equals 5 length unit , then a =

- (a) - 1 or 5 (b) 10 (c) 1 or - 5 (d) 7

[3] The sum of measures of the angles of the quadrilateral equals

- (a) 180° (b) 360° (c) 540° (d) 720°

[4] If the straight lines $3 X - 4 y - 3 = 0$, $ky + 4 X - 8 = 0$ are perpendicular , then k =

- (a) - 4 (b) 3 (c) 13 (d) 4

[5] The area of the rhombus whose diagonals lengths are 10 cm. and 12 cm equals cm^2

- (a) 120 (b) 60 (c) 22 (d) 15

[6] ABCDEF is a regular hexagon , $m(\angle BAC) = X^\circ$, then $\sin X = \dots\dots\dots$

- (a) $\frac{BC}{AB}$ (b) $\frac{BC}{AC}$ (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{2}$

- 2 [a]** If X is the measure of an acute angle , find the value of X which satisfies :
 $2 \sin X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$
- [b]** Prove that the straight line which passes through the two points $(-3, -2)$, $(4, 5)$ is parallel to the straight line which makes an angle of measure 45° with the positive direction of X -axis.
-
- 3 [a]** ABC is an isosceles triangle in which $AB = AC = 10$ cm. , $BC = 12$ cm.
Find : **[1]** $m(\angle B)$
[2] The area of the triangle.
- [b]** Find the slope and the y-intercept by the straight line $2X - 3y - 6 = 0$
-
- 4 [a]** Without using calculator , prove that :
 $\tan^2 60^\circ - \tan^2 45^\circ = \sin^2 60^\circ + \cos^2 60^\circ + 2 \sin 30^\circ$
- [b]** Find the equation of the straight line which passes through the point $(3, -5)$ and is parallel to the straight line $X + 2y - 7 = 0$
-
- 5 [a]** Prove that the points A $(-1, 3)$, B $(5, 1)$ and C $(6, 4)$ and D $(0, 6)$ are the vertices of a rectangle.
- [b]** If the point $(2, 3)$ is the midpoint of $\overline{AB}$, where $A \in X$ -axis , $B \in y$ -axis. , find the coordinates of A and B

4

El-Kalyoubia Governorate



Answer the following questions :

- 1 Choose the correct answer from the given ones :**
- [1]** The number of axes of symmetry of the semicircle equals
 (a) 0 (b) 1 (c) 2 (d) an infinite number.
- [2]** The distance between the point $(-4, 2)$ and y-axis equals length unit.
 (a) -4 (b) -2 (c) 2 (d) 4
- [3]** If $2 \sin X = \tan X$ where X is the measure of an acute angle , then $X =$
 (a) 30° (b) 45° (c) 60° (d) 90°
- [4]** If $\overrightarrow{AB} \perp \overrightarrow{CD}$, and the slope of $\overrightarrow{AB} = \frac{1}{5}$, then the slope of $\overrightarrow{CD} =$
 (a) -5 (b) $-\frac{1}{5}$ (c) 5 (d) $\frac{1}{5}$

- 5 The straight line whose equation is $2y = 5x + 6$ cuts from the positive part of y-axis a part equals length unit.

(a) 2 (b) 3 (c) 5 (d) 6

- 6 $\sin 30^\circ + \cos 60^\circ = \dots\dots\dots$

(a) $\frac{1}{4}$ (b) 0 (c) 1 (d) $\frac{\sqrt{3}}{2}$

- 2 [a] Without using the calculator, prove that : $2 \sin 30^\circ = \tan^2 60^\circ - 2 \tan 45^\circ$

- [b] Find the equation of the straight line which passes through the point $(2, -5)$ and its slope is 2

- 3 [a] If C is the midpoint of $\overline{AB}$ where $A(-3, y)$, $B(9, 11)$ and $C(x, -3)$, find the value of each of x and y

- [b] Prove that the straight line passing through the two points $(-1, 3)$, $(2, 4)$ is parallel to the straight line $x - 3x + 1 = 0$

- 4 [a] If $2 \cos x - \sqrt{3} = 0$ where x is the measure of an acute angle, find : $\tan 2x$

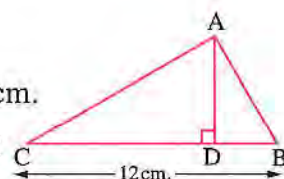
- [b] Prove that the points $A(-3, -1)$, $B(6, 5)$ and $C(3, 3)$ are collinear.

- 5 [a] Prove that the points $A(3, 2)$, $B(4, -3)$, $C(-1, -2)$ and $D(-2, 3)$ are the vertices of the rhombus ABCD

- [b] In the opposite figure :

ABC is an acute-angled triangle where $\overline{AD} \perp \overline{BC}$ and $BC = 12$ cm.

Find by showing the steps the value of : $AB \cos B + AC \cos C$



5

El-Sharkia Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- 1 If the straight line whose equation is $kx + \sqrt{3}y = 4$ makes an angle of measure 60° with the positive direction of x -axis, then $k = \dots\dots\dots$

(a) 3 (b) -3 (c) $\sqrt{3}$ (d) $-\sqrt{3}$

- 2 In $\triangle ABC$, if $\sin A = \cos C$, then $\triangle ABC$ is

(a) an acute-angled triangle. (b) a right-angled triangle.
(c) an obtuse-angled triangle. (d) an isosceles triangle.

3 The rhombus whose diagonals lengths are 12 cm. , 10 cm. , its area is cm^2

- (a) 120 (b) 60 (c) 22 (d) 16

4 A triangle has only one axis of symmetry and two side lengths of its sides are 4 cm. , 8 cm. , then the length of its third side is cm.

- (a) 5 (b) 12 (c) 4 (d) 8

5 If the two vertically opposite angles are supplementary , then the measure of each one is

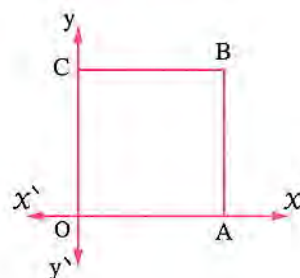
- (a) 45° (b) 180° (c) 90° (d) 60°

6 In the opposite figure :

OABC is a square of side length 4 cm.

, then the equation of $\overleftrightarrow{AC}$ is

- (a) $y = x + 4$ (b) $y = x - 4$
(c) $y = -x + 4$ (d) $x = 4y + 4$



2 [a] Find the equation of the straight line which passes through the point (3 , -1) and is parallel to the straight line which passes through the two points (-2 , 1) , (1 , 5)

[b] If $2 \tan X = \tan^2 60^\circ - 2 \sin 30^\circ$ where X is an acute angle , find : $m(\angle X)$

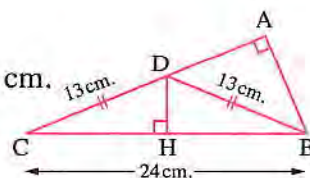
3 [a] If the points A (1 , 4) , B (-1 , -2) and C (2 , -3) are the vertices of a triangle , prove that : $\triangle ABC$ is right-angled at B , and find its area.

[b] In the opposite figure :

$\triangle ABC$ is right-angled at A , $D \in \overline{AC}$, where $BD = DC = 13 \text{ cm}$.

, $\overline{DH} \perp \overline{BC}$, $BC = 24 \text{ cm}$.

Find the value of : 1 $\tan(\angle DCB)$ 2 $\cos(\angle ABC)$



4 [a] Find the equation of the straight line which passes through the point (10 , 2) and is perpendicular to the straight line whose equation is $5x - 2y = 17$

[b] ABCD is a parallelogram whose vertices are A (3 , 2) , B (4 , -5) , C (0 , -3)

Find : 1 The coordinates of the intersection point of its diagonals.

2 The coordinates of the point D

5 [a] Without using the calculator, find the value of : $\sin^2 30^\circ - 9 \cos^2 60^\circ + \tan^2 45^\circ$

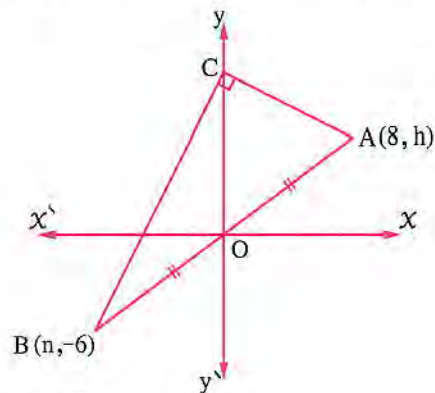
[b] In the opposite figure :

$\triangle ABC$ is right-angled at C ,

where A (8 , h) , B (n , -6) , O is the midpoint of $\overline{AB}$

Find : **[1]** h + n

[2] The equation of $\overleftrightarrow{AC}$



6

El-Gharbia Governorate



Answer the following questions :

1 Choose the correct answer from the given ones :

[1] If the lengths of two sides of a triangle are 2 cm. and 5 cm. , then the perimeter of the triangle $\in$

- (a)]3 , 7[(b)]4 , 6[(c)]10 , 14[(d)]9 , 21[

[2] If $\overline{AB} \equiv \overline{XY}$, then $\frac{3 \overline{AB}}{5 \overline{XY}} =$

- (a) 1 (b) 0.6 (c) zero (d) 1.7

[3] The edge length of a cube is 8 cm. , then its volume is cm^3

- (a) 2 (b) 32 (c) 64 (d) 512

[4] If $\sin 30^\circ = \cos \theta$, where θ is the measure of an acute angle , then $\theta =$

- (a) 15° (b) 30° (c) 60° (d) 90°

[5] If the straight line $y = kx + 1$ is parallel to the straight line $2y - x = 5$, then $k =$

- (a) 1 (b) $\frac{1}{2}$ (c) 2 (d) -2

[6] If the x-axis bisects $\overline{AB}$ such that A (3 , 2) and B (x , y) , then $y =$

- (a) -3 (b) -2 (c) 2 (d) 3

2 [a] XYZ is a right-angled triangle at Z , $XZ = 7$ cm. and $XY = 25$ cm.

Find the value of : $\tan X \times \tan Y$

[b] If $\overline{AB}$ is a diameter in the circle M , where B (8 , 11) , M (5 , 7)

, find : **[1]** The coordinates of the point A

[2] The circumference of the circle in terms of π

- 3 [a] If the distance between the point $(a, 7)$ and the point $(0, -5)$ equals 13 length units ,
find : the value of a

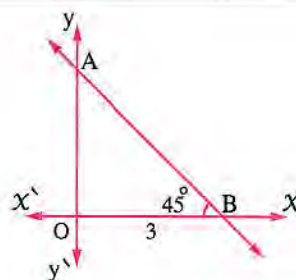
- [b] Without using the calculator , find the value of X (where X is the measure of an acute angle)
 , if $2 \sin X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$

- 4 [a] In the opposite figure :

$\overrightarrow{AB}$ intercepts from the positive part
 of X -axis 3 length units

, $m(\angle ABO) = 45^\circ$

Find the equation of $\overrightarrow{AB}$



- [b] Without using the calculator , prove that :

$$\sin^2 60^\circ - \tan 60^\circ \cos 30^\circ + \cos 60^\circ \sin 30^\circ = \sin 30^\circ - \sin^2 45^\circ - \cos 60^\circ$$

- 5 [a] If ABCD is a square where $A(3, 5)$, $C(5, -1)$, find the slope of $\overrightarrow{BD}$

- [b] Find the equation of the straight line which passes through the point $(3, -5)$ and is
 parallel to the straight line $X + 2y - 7 = 0$

7

Ismailia Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- 1 The number of axes of symmetry of the equilateral triangle is

(a) zero (b) 1 (c) 2 (d) 3

- 2 If $2 \cos 2X = 1$, where $2X$ is the measure of an acute angle, then $X = \dots\dots\dots$

(a) 15° (b) 30° (c) 45° (d) 60°

- 3 The angle whose measure is 50° supplements an angle of measure

(a) 40° (b) 90° (c) 130° (d) 180°

- 4 The distance between the point $(-2, 3)$ and X -axis equals length units.

(a) 3 (b) -3 (c) 2 (d) -2

- 5 If the point A lies on the axis of symmetry of $\overline{XY}$, then $\overline{AX} \dots\dots\dots \overline{AY}$

(a) // (b) $\perp$ (c) = (d) $\equiv$

- 6 The straight line whose equation is $2X - 3y = 6$ intercepts from the negative part of
 y -axis a part of length length units.

(a) -6 (b) -2 (c) 3 (d) 2

- 2 [a]** If $A = (5, 1)$, $B = (3, -7)$ and $C = (1, 3)$
 , prove that the points A , B and C are non-collinear points.

[b] Without using the calculator , prove that :

$$\cos 60^\circ + 2 \sin^2 45^\circ = \sin 30^\circ + 3 \tan^2 30^\circ$$

- 3 [a]** ΔABC is a right-angled triangle at B , $5 \sin C = 3$

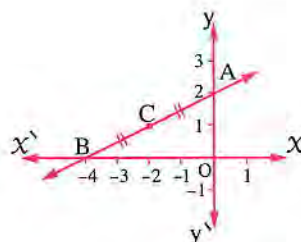
Find the value of : $\cos A \cos C - \sin A \sin C$

[b] In the opposite figure :

C is the midpoint of $\overline{AB}$

Find : **[1]** The coordinates of the point C

[2] The equation of $\overrightarrow{CO}$



- 4 [a]** Find the equation of the straight line which passes through the point $(0, -2)$ and is parallel to the straight line : $x - 2y = 7$

[b] Prove that the straight line which passes through the two points $(4, 3\sqrt{3})$ and $(5, 2\sqrt{3})$ is perpendicular to the straight line that makes with the positive direction of the X-axis an angle of measure 30°

- 5 [a]** Show the type of ΔABC such that $A(3, 3)$, $B(1, 5)$ and $C(1, 3)$ according to its sides lengths.

[b] Without using the calculator , find the value of x if $\sin x = \tan 30^\circ \sin 60^\circ$
 where x is the measure of an acute angle.

8

Suez Governorate



Answer the following questions : (Calculator is allowed)

- 1** Choose the correct answer from those given :

[1] $\tan 45^\circ \sin 30^\circ = \dots\dots\dots$

- (a) 1 (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{1}{4}$

[2] If $\Delta ABC \equiv \Delta XYZ$, then $\overline{AB} \dots\dots\dots \overline{XY}$

- (a) < (b) = (c) $\equiv$ (d) >

- 3 If $\overrightarrow{AB} \parallel \overrightarrow{CD}$ and the slope of $\overrightarrow{AB} = \frac{2}{3}$, then the slope of $\overrightarrow{CD} = \dots\dots\dots$
 (a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $-\frac{2}{3}$ (d) $-\frac{3}{2}$
- 4 If $\triangle ABC$ is right-angled at B, $AB = BC$, then $m(\angle C) = \dots\dots\dots$
 (a) 90° (b) 50° (c) 45° (d) 30°
- 5 The straight line whose equation is $2x + 3y - 6 = 0$ cuts from the positive part of y-axis a part of length $\dots\dots\dots$ unit.
 (a) -6 (b) -2 (c) $\frac{2}{3}$ (d) 2
- 6 If ABCD is a rhombus, $m(\angle A) + m(\angle C) = 140^\circ$, then $m(\angle A) = \dots\dots\dots$
 (a) 70° (b) 40° (c) 110° (d) 220°

- 2 [a] If C is the midpoint of $\overline{AB}$, A (2, 4), B (6, 0), find the coordinates of the point C
 [b] Find the equation of the straight line whose slope equals 2 and passes through the point (2, 3)

- 3 [a] Without using calculator, prove that : $\sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$
 [b] Show the type of $\triangle ABC$ according to its sides if A (0, 0), B (3, 4) and C (-4, 3)

- 4 [a] If $3 \tan E = 2 \sin 30^\circ + 4 \cos 60^\circ$, find : $m(\angle E)$ (Where E is an acute angle)
 [b] Find the slope of the straight line which is perpendicular to the straight line passing through the two points (3, -2), (5, 1)

- 5 [a] If ABC is a right-angled triangle at B, $AB = 3$ cm., $BC = 4$ cm., find :
 1 The length of $\overline{AC}$ 2 $\sin^2 C + \cos^2 C$
 [b] Prove that the points A (4, 3), B (1, 1) and C (-5, -3) are collinear.

9

Damietta Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :

- 1 $\sin 25^\circ = \cos \dots\dots\dots$
 (a) 25° (b) 65° (c) 90° (d) 155°
- 2 The angle whose measure is more than 90° and less than 180° is $\dots\dots\dots$ angle.
 (a) an obtuse (b) an acute (c) a right (d) a straight

3 The slope of the straight line parallel to the X -axis is

- (a) undefined (b) -1 (c) 1 (d) zero

4 The lengths of two sides of an isosceles triangle equal 3 cm. , 7 cm. , then the length of the third side equals cm.

- (a) 3 (b) 4 (c) 7 (d) 10

5 The distance between the point $(-3, 2)$ and the y -axis equals length units.

- (a) 3 (b) 2 (c) -2 (d) -3

6 The number of axes of symmetry of the opposite shape is

- (a) 1 (b) 2
(c) 3 (d) 4



2 [a] If $C(6, -4)$ is the midpoint of $\overline{AB}$ where $A(5, -3)$, then find the point B

[b] Find the equation of the straight line passing through the point $(3, 4)$ and parallel to the straight line $X - 2y + 3 = 0$

3 [a] Without using calculator , prove that : $2 \sin 30^\circ + 4 \cos 60^\circ = \tan^2 60^\circ$

[b] Prove that the points $A(-2, 0)$, $B(5, 1)$ and $C(6, -6)$ which belong to an orthogonal cartesian coordinates plane lie on the circle whose centre is $M(2, -3)$
Find the circumference of the circle. (where $\pi = 3.14$)

4 [a] If $\cos X \tan 30^\circ = \cos^2 45^\circ$, find the value of X , where X is the measure of an acute angle.

[b] Find the equation of the straight line passing through the two points $(1, 2)$, $(-1, -2)$, then prove that it passes through the origin point.

5 [a] Find the slope of the straight line : $3y - 2x - 6 = 0$, then find the length of the intercepted part from y -axis.

[b] In the opposite figure :

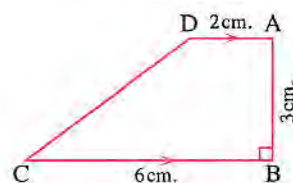
$ABCD$ is a trapezium

, $\overline{AD} \parallel \overline{BC}$, $m(\angle B) = 90^\circ$

, $AB = 3\text{ cm.}$, $BC = 6\text{ cm.}$ and $AD = 2\text{ cm.}$

Find : 1 The length of $\overline{DC}$

2 The value of $\cos(\angle BCD)$



10

El-Beheira Governorate



Answer the following questions : (Calculator is permitted)

1 Choose the correct answer from the given ones :

1 $4 \cos 30^\circ \tan 60^\circ = \dots\dots\dots$

(a) 3

(b) $2\sqrt{3}$

(c) 6

(d) 12

2 The straight line whose equation is $2x - 3y - 6 = 0$ intersects from the negative part of y-axis a part of length length unit.

(a) -6

(b) -2

(c) $\frac{2}{3}$

(d) 2

3 A circle its centre is the origin point and its radius length is 5 length unit. Which of the following points belongs to the circle ?

(a) (-3 , 4)

(b) (2 , 3)

(c) (1 , 2)

(d) (-5 , 5)

4 If ABCD is a parallelogram in which $m(\angle A) + m(\angle C) = 200^\circ$, then $m(\angle B) = \dots\dots\dots$

(a) 40°

(b) 80°

(c) 100°

(d) 160°

5 The acute angle is complemented by an angle

(a) acute.

(b) right.

(c) obtuse.

(d) reflex.

6 A triangle with one axis of symmetry and two sides lengths are 4 cm. and 8 cm. , then its perimeter is cm.

(a) 16

(b) 20

(c) 4

(d) 8

2 [a] Without using the calculator , find the value of X (where X is the measure of an acute angle) which satisfies : $\tan X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$

[b] Find the equation of the straight line whose slope equals 2 and passes through the point (1 , 0)

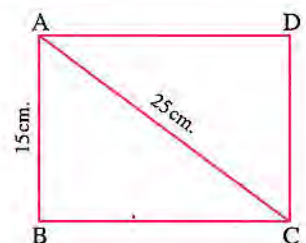
3 [a] In the opposite figure :

ABCD is a rectangle in which $AB = 15$ cm.

and $AC = 25$ cm.

Find : 1 $m(\angle ACB)$

2 The surface area of the rectangle ABCD



- [b] If the straight line L_1 passes through the two points $(4, 3)$, $(2, k)$ and the straight line L_2 makes with the positive direction of the X -axis a positive angle of measure 45° , find the value of k if $L_1 \perp L_2$

- 4 [a] If C is the midpoint of $\overline{AB}$ where $A(-3, y)$, $B(9, 11)$ and $C(x, 3)$, find x, y

- [b] ABC is a triangle in which $AB = AC = 5$ cm. and $BC = 8$ cm.

Draw $\overrightarrow{AD} \perp \overline{BC}$, $\overrightarrow{AD} \cap \overline{BC} = \{D\}$ Prove that : $\frac{5 \tan B \cos C}{\sin^2 C + \cos^2 B} = 3$

- 5 [a] Prove that the straight line which passes through the two points $(-1, 3)$, $(1, 4)$ is parallel to the straight line whose equation is $2y - x = 1$

- [b] Prove that the triangle whose vertices are the points $A(-3, 0)$, $B(3, 4)$ and $C(1, -6)$ is an isosceles triangle of vertex A

11

El-Menia Governorate



Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer :

- 1 The sum of the measures of the interior angles of a pentagon equals

(a) 36° (b) 72° (c) 108° (d) 540°

- 2 The area of the rhombus whose diagonals lengths are 6 cm. and 8 cm. equals cm^2

(a) 10 (b) 20 (c) 24 (d) 48

- 3 The angle whose measure is $89^\circ 59'$ is

(a) acute. (b) right. (c) obtuse. (d) reflex.

- 4 If $\tan 3X = \sqrt{3}$, X is the measure of an acute angle, then $X = \dots\dots\dots$

(a) 10° (b) 20° (c) 30° (d) 60°

- 5 A circle of centre at the origin point and its radius length is 2 units.

Which of the following points belongs to the circle ?

(a) $(1, -2)$ (b) $(-2, \sqrt{5})$ (c) $(\sqrt{3}, 1)$ (d) $(0, 1)$

- 6 The equation of the straight line which passes through the point $(2, 3)$ and is parallel to the X -axis is

(a) $x = 2$ (b) $y = 3$ (c) $y = 2x$ (d) $x = 3y$

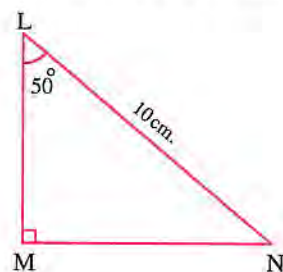
- 2 [a]** Prove that the straight line which passes through the points $(0, 3)$, $(1, 6)$ is parallel to the straight line $3x = y - 1$
- [b]** ABC is a right-angled triangle at B, $AB = 5$ cm. and $BC = 12$ cm.
Prove that : $\sin^2 A + \cos^2 A = 1$
-
- 3 [a]** Find the equation of the straight line whose slope is $\frac{1}{2}$ and passes through the point $(2, 3)$
- [b]** If the point C $(2, -1)$ is the midpoint of $\overline{AB}$, A $(1, 3)$, find the point B
-
- 4 [a]** Prove that the triangle of the vertices A $(1, 3)$, B $(3, 2)$ and C $(0, -4)$ is right-angled at B, then find its surface area.
- [b] Without using calculator, find the value of :** $(\cos 30^\circ + \sin 60^\circ)^2 - \tan^2 45^\circ$
-
- 5 [a]** Find the equation of the straight line which passes through the origin point parallel to the straight line that makes an angle of measure 60° with the positive direction of the X-axis.

[b] In the opposite figure :

LMN is a right-angled triangle at M

, $LN = 10$ cm. , $m(\angle L) = 50^\circ$

Find the length of $\overline{LM}$ to the nearest decimal number.



12

Souhag Governorate



Answer the following questions : (Calculator is allowed)

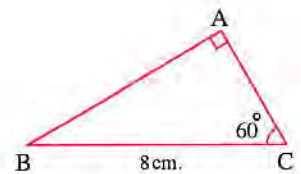
1 Choose the correct answer from the given ones :

- 1** The distance between the point $(4, -3)$ and the X-axis equals length units.
 (a) -3 (b) 3 (c) 4 (d) 5
- 2** The perimeter of the square whose surface area is 100 cm^2 equals cm.
 (a) 10 (b) 20 (c) 40 (d) 50
- 3** $\tan 45^\circ \sin 30^\circ = \dots\dots\dots$
 (a) $\frac{1}{2}$ (b) 1 (c) $\frac{2}{3}$ (d) $\frac{1}{4}$

4 In the opposite figure :

The length of $\overline{AC}$ = cm.

- (a) 2 (b) 6
(c) 4 (d) 8



5 If $\frac{-2}{3}$, $\frac{k}{2}$ are the slopes of two parallel straight lines , then k =

- (a) $\frac{-4}{3}$ (b) $\frac{-3}{4}$ (c) $\frac{1}{3}$ (d) 3

6 If the lengths 3 , 7 , ℓ are lengths of sides of a triangle , then ℓ can be equal to

- (a) 3 (b) 7 (c) 4 (d) 10

2 [a] Without using calculator , find the value of :

$$\cos 60^\circ \sin 30^\circ - \sin 60^\circ \cos 30^\circ$$

[b] Identify the type of the triangle whose vertices are A (- 2 , 4) , B (3 , - 1) , C (4 , 5) due to its sides lengths.

3 [a] If $\sin^2 45^\circ = \cos E \tan 30^\circ$, **find** : $m(\angle E)$ where E is an acute angle.

[b] $\overline{AB}$ is a diameter of the circle M , B (8 , 11) , M (5 , 7) , then find the coordinates of A

4 [a] In the opposite figure :

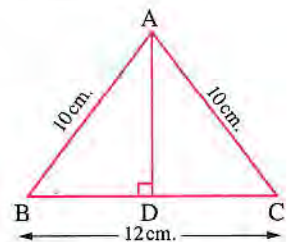
ABC is a triangle in which :

$AB = AC = 10$ cm. , $BC = 12$ cm

, $\overline{AD}$ is perpendicular to $\overline{BC}$

, $\overline{AD} \cap \overline{BC} = \{D\}$

Prove that : $\sin^2 B + \cos^2 C = 1$



[b] Find the equation of the straight line which passes through the point (1 , 6) and the midpoint of $\overline{AB}$, where A (1 , - 2) , B (3 , - 4)

5 [a] Find the equation of the straight line passing through the point (3 , - 5) and parallel to the straight line $x + 2y - 7 = 0$

[b] Find the slope of the straight line and the length of the intercepted part of y-axis where its equation is $4x + 5y - 10 = 0$



Answer the following questions :

1 Choose the correct answer :

- 1** A triangle has one axis of symmetry and the lengths of two sides are 3 cm. , 7 cm. , then the length of the third side is cm.
 (a) 3 (b) 4 (c) 7 (d) 10
- 2** The point of intersection of the medians of the triangle divides each of them by the ratio : 5 from the vertex.
 (a) 5 (b) 2 (c) 1 (d) 10
- 3** The length of any side of a triangle the sum of lengths of the other two sides.
 (a) > (b) $\geq$ (c) < (d) =
- 4** If $\sin 2X = \frac{1}{2}$ where $2X$ is the measure of an acute angle , then $\tan 3X =$
 (a) $\frac{1}{2}$ (b) $\frac{1}{\sqrt{3}}$ (c) $\sqrt{3}$ (d) 1
- 5** The distance between the point $(-3, -4)$ and the X -axis is length units.
 (a) 3 (b) -3 (c) 4 (d) -4
- 6** The area of the triangle bounded by the straight lines $3X + 8y = 24$, $X = 0$, $y = 0$ equals square unit.
 (a) 24 (b) 8 (c) 12 (d) 3

2 [a] ABC is a triangle right-angled at C , AB = 13 cm. , BC = 12 cm.

- 1 Find :** The length of $\overline{AC}$
- 2 Prove that :** $\sin A \cos B + \cos A \sin B = 1$
- 3 Find the value of :** $1 + \tan^2 A$

[b] Prove that the points A (3 , -1) , B (-4 , 6) , C (2 , -2) lie on a circle whose centre is M (-1 , 2) , then find the circumference of the circle in terms of π

3 [a] Find the value of X if : $4X = \cos^2 30^\circ \tan^2 30^\circ \tan^2 45^\circ$

[b] If C is the midpoint of $\overline{AB}$, find X and y where A (X , 3) , B (6 , y) , C (4 , 6)

- 4 [a] A ladder of length 6 m. , its upper end A is on a vertical wall and its lower end B is on a horizontal ground , if C is the projection of the point A on the ground and the ladder inclines by an angle of measure 60° on the ground , find the length of $\overline{AC}$

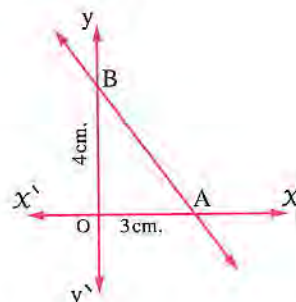
[b] If A (2 , - 1) , B (1 , 1) , find the equation of $\overleftrightarrow{AB}$

- 5 [a] If the points X (0 , 1) , Y (a , 3) , Z (2 , 5) are collinear , find the value of a

[b] In the opposite figure :

$\overleftrightarrow{AB}$ is a straight line Find :

- [1] The coordinates of the midpoint of $\overline{AB}$
 [2] The equation of the straight line passing by the origin point perpendicular to $\overleftrightarrow{AB}$



14 South Sinai Governorate



Answer the following questions :

- 1 Choose the correct answer from the given answers :

[1] $\cos 60^\circ = \dots\dots\dots$

(a) $\frac{1}{2}$

(b) $\frac{\sqrt{3}}{2}$

(c) $\frac{1}{\sqrt{2}}$

(d) $\sqrt{3}$

[2] The number of axes of symmetry of an equilateral triangle equals

(a) zero.

(b) 1

(c) 2

(d) 3

[3] The points (0 , 0) , (6 , 0) and (0 , 8)

(a) form an acute-angled triangle.

(b) form a right-angled triangle.

(c) form an obtuse-angled triangle.

(d) are collinear.

[4] The equation of the straight line which passes through the point (2 , 3) and is parallel to y-axis is

(a) $x = 2$

(b) $x = 3$

(c) $y = 2$

(d) $y = 3$

[5] The distance between the point $(\sqrt{3} , 1)$ and the origin point is length units.

(a) 4

(b) 3

(c) 2

(d) $\sqrt{10}$

[6] If the perimeter of a square is 4 cm. , then its area is cm^2

(a) 16

(b) 4

(c) 2

(d) 1

- 2 [a]** If $2 \sin X = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$, find the value of X where X is the measure of an acute angle.
- [b]** Find the equation of the straight line whose slope equals 2 and intersects from the negative part of the y -axis a part of length 3 units.
-
- 3 [a]** If the point $(4, 6)$ is the midpoint of the distance between $(X, 3)$, $(6, y)$, find the value of Xy .
- [b] Without using calculator, prove that :** $\sin 60^\circ = 2 \sin 30^\circ \cos 30^\circ$
-
- 4 [a]** Prove that the points $A(-3, 0)$, $B(3, 4)$, $C(1, -6)$ are the vertices of an isosceles triangle.
- [b]** Find the equation of the straight line perpendicular to $\overline{AB}$ from its midpoint where $A(1, 3)$, $B(3, 5)$
-
- 5 [a]** XYZ is a right-angled triangle at Y in which $XY = 5$ cm., $XZ = 13$ cm.
Find : **[1]** The length of $\overline{YZ}$ **[2]** $\cos X \cos Z - \sin X \sin Z$
- [b]** Prove that the straight line passing through the two points $(2, -1)$, $(6, 3)$ is parallel to the straight line that makes with the positive direction of the X -axis an angle of measure 45°

15**Matrouh Governorate**

Answer the following questions : (Calculator is allowed)

- 1 Choose the correct answer from those given :**
- [1]** If m_1, m_2 are the slopes of two perpendicular straight lines, then $m_1 \times m_2 = \dots\dots\dots$
 (a) 0 (b) 1 (c) -1 (d) 2
- [2]** The number of the symmetry axes of an isosceles triangle is $\dots\dots\dots$
 (a) 0 (b) 1 (c) 2 (d) 3
- [3]** In a parallelogram, the diagonals are $\dots\dots\dots$
 (a) perpendicular. (b) equal in length.
 (c) bisecting each other. (d) perpendicular and equal in length.
- [4]** If $A(5, 7)$, $B(1, -1)$, then the midpoint of $\overline{AB}$ is $\dots\dots\dots$
 (a) $(2, 3)$ (b) $(3, 3)$ (c) $(3, 2)$ (d) $(3, 4)$

Trigonometry and Geometry

5 A circle has a surface area of $4\pi \text{ cm}^2$, then its radius length is cm.

- (a) 2 (b) 4 (c) 2π (d) 4π

6 In $\triangle ABC$, if $m(\angle A) = 60^\circ$, $\sin B = \cos B$, then $m(\angle C) = \dots\dots\dots$

- (a) 30° (b) 75° (c) 90° (d) 105°

2 [a] $\triangle ABC$ is right-angled at C, $AC = 5 \text{ cm}$, $AB = 13 \text{ cm}$.

Find : 1 $\sin A \cos B + \cos A \sin B$ 2 $1 + \tan^2 B$

[b] Prove that the points A (4, 3), B (1, 1), C (-5, -3) are collinear.

3 [a] Find the value of X if : $X \sin 30^\circ \cos^2 45^\circ = \sin^2 60^\circ$

[b] Find the slope and the intercepted part of y-axis of the straight line whose equation is $4x + 5y - 10 = 0$

4 [a] Find the equation of the straight line which passes through the point (1, 6) and the midpoint of $\overline{AB}$ where A (1, -2), B (3, -4)

[b] State the kind of the triangle ABC, where A (-2, 4), B (3, -1) and C (4, 5) with respect to its sides.

5 [a] If $4 \cos 60^\circ \sin 30^\circ = \tan \theta$, find : $m(\angle \theta)$ where θ is an acute angle.

[b] Prove by using the slope that the points A (-1, 3), B (5, 1), C (6, 4), D (0, 6) are the vertices of a rectangle.



كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9

